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ABSTRACT

The procedures, analyses, results, and discussion of a project which compared three methods of physical education programing for 96 emotionally disturbed children (6 to 14 years of age) in an 8-week summer camp program held during two summers are presented. The first year's program is seen to have served as a field test, with the most reliable data resulting from the second year's program. Four groups, each with eight aggressive, eight hyperactive, and eight withdrawn children are reported to have been assigned to four treatments; control, physical fitness, general coordination, and specific coordination. Detailed training manuals used in the program are provided for each of the three treatments. It is explained that the physical fitness group received activities aimed at improving strength, endurance, speed, and flexibility, while the general coordination group received activities to improve a child's ability to maneuver his body, and the specific coordination group received activities to improve performance in selected games. The following major findings are reported: the specific coordination group exhibited superior performance on the strength criterion, the Bender developmental age scores, and the Deverux measure; though the general coordination group excelled in having the least impatience and equaled the specific coordination group in coordination. It is concluded that restructuring the physical activities of the disturbed children raised the quality of motoric behavior but had little effect on emotional adjustment or academic aptitude. (DB)

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Final Report on the Research Project "A Comparison of Three Methods of Physical Education Programming for Emotionally Disturbed Children"

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Dr. Lester Mann, Project Director
Mr. Robert M. Burger, Evaluation Consultant
Mr. Paul Green, Evaluation Consultant
Dr. Barton Proger, Evaluation Consultant
Dr. Donald Hilsendager, Director of Training
Dr. Robert Bayuk, Evaluation Consultant

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Preface

This final report document contains the procedures, analyses, results, and discussion from the first and second years of the research project entitled, "A Comparison of Three Methods of Physical Education Programming for Emotionally Disturbed Children." The specific training activities used with each of the three methods were quite detailed. As a result, any description of such activities and evaluation of their effectiveness becomes lengthy. The reader should thus be given some hints as to how to proceed most profitably through this document.

This research project gathered data during the summers of two consecutive years. The treatments and design used were similar for the two years. However, some modifications were made in second-year implementation of the project as a result of experience derived from the first year. For example, the training of instructors was upgraded to yield greater consistency in application of activities and in administration of tests. Further, greater control and standardization of test conditions were exercised during the second year. A third improvement in the second year was in the selection of analytical schemes to be more reflective of special problems in the measurements under consideration (especially in the physical performance realm).

The report is divided into three major sections. Each section has its relevant appendices attached before the next section is begun. However, before the reader decides to read any main section of this report in detail, he is advised to read the Summary Abstract, which documents the procedures and major findings of the second year.

To allow the reader to gain an understanding of precisely how the physical education program activities were implemented in each treatment, and to allow others to attempt replication of these results, Section I is provided. In this section are such items as a training manual and a test manual for the physical performance areas.

The actual results and specific features of the first and second years of operation are contained in Sections II and III, respectively. Extensive numerical documentation on the effectiveness of the three training procedures is given through tables and figures.

Finally, with regard to the interpretation of Section I, II, and III, a few words of caution are in order. First, since the second year's procedures and analyses were carried out in a more sophisticated manner than the first year, the reader should consider the first year in the sense of a field test used for formative evaluation; greatest weight should be given to the second year's data. Second, the reliability figures given in Appendix B of Section I are subject to question in terms of the two negative coefficients reported; further analysis of that data was not possible at the time the total report was compiled. Third, the covariance analyses of Appendix C under Section I should be interpreted only as a preliminary look at the first year's results; Section II is a more exhaustive analysis in this sense.

It was the purpose of this research to provide a large amount of data collected on a broad array of variables. The authors hope that their effort will provide the reader with the information he seeks and stimulate substantive research into areas suggested by this document.

SECTION I
PROCEDURAL CONSIDERATIONS

FINAL REPORT ON THE RESEARCH PROJECT
"A COMPARISON OF THREE METHODS OF PHYSICAL EDUCATION PROGRAMMING FOR EMOTIONALLY DISTURBED CHILDREN"

Section I

Introduction

This section of the report is designed to present three areas of actual procedures which were followed for two years while implementing the research proposal titled A Comparison of Three Methods of Physical Education Programming for Emotionally Disturbed Children. The section is organized into three areas: (1) physical performance evaluation techniques, (2) training of staff, and (3) treatment procedures for subjects.

Physical Performance Evaluation Techniques

During the first year of the program a team of six testers were selected and trained to administer the physical performance tests to each subject in the school which he regularly attended. This procedure proved unsatisfactory. The subjects were tested under varied conditions caused by different facilities, equipment and weather. This also proved very inefficient regarding use of tester time due to time spent in travel and setting up testing stations.

A number of changes were made for the second year testing program. Twenty testers were used and the subjects were transported to and from a central location where testing was done during a four day period. This resulted in constant facility, equipment, and weather conditions for all test data. A detailed test directions manual was developed and given to the testers during the first meeting training them to administer the tests. (See appendix A). Each tester was trained to administer all of the tests and was further informed regarding the specific test items to which he was assigned. The demonstration of test item administration after the tester knew which items he was to be responsible for was found to be essential in attaining effective results. Further, supervision of testers during actual test administration was found to be a necessity to maintain standard test conditions. The test program changes made for the second year proved very satisfactory and are recommended for use in similar programs.

As indicated in the original research proposal the first year of the project included three testing periods; pre, post, and retention. During the second year it was decided to add a fourth testing period. The additional testing period immediately followed the post testing period and was done to establish the reliability of the data collected. All of the tests used were established tests, however, many of them had not been used extensively with emotionally handicapped children. This factor, plus the desire to determine with some degree of certainty the reliability of the data collected under the exact conditions of the present research, i.e. subjects, facilities, equipment, testers, etc., resulted in the decision to include a reliability check. This is believed to be vital to further interpretation of the data and can serve to answer to what degree trust can be placed in reliability figures established on physical performance tests with "normal" children when these tests are purposed for use with emotionally handicapped children. The contrast of published reliability coefficients found with "normal" subjects and the subjects used in the present study is shown in appendix B.

Training Procedures For Staff

The staff were male physical education teachers. Approximately one-third of the staff had experience in working with emotionally handicapped children. Each year at least three of the staff had done graduate work beyond the master's degree level. Four staff members who worked in the 1970 program were rehired for the 1971 program.

It was required that the staff participate in the initial testing program. Exceptions to this requirement were made during the 1971 program for two staff members who were employed full time as physical education teachers for special education students in the public schools. The requirements furnished the staff with experience in working with emotionally handicapped children. It further enabled the staff to see the specific children they would be working with and to view their performance under standardized conditions. This experience did prove valuable as the staff participated in the planning of the specific summer activities for the children, because it was possible to know how activities would need to be modified to fit the abilities of the subjects in general and of certain children specifically.

The staff was organized into three teams, one for each experimental treatment group, each with an experienced team leader. The team leaders held a series of meetings alone and with the Director of Training during the winter of 1971 in preparation for the summer program. The purposes of these meetings were to select the members of each staff team, plan each specific activity for each day of the program, identify needed facilities and equipment, as well as establishing general administrative procedures. A primary purpose in the meetings was to develop in the team leaders a sense of identity with and importance of the total project.

During the 1970 program the Director of Training had initiated and directly supervised the functioning of the teams. This procedure did not appear to achieve the kind of commitment that was desired and resulted in the decision to deeply involve the team leaders in the total planning process during the 1971 program. Each team leader during the 1971 program also met individually with his team members whom he involved in the specific planning. The procedures used during the 1971 program were effective in developing a sense of commitment on the part of the total staff, particularly of the team leaders who were very willing to hold meetings and prepare written materials during their free time, and brought concerns about the effectiveness of activities to the attention of the director of training. The involvement procedures are considered vital and are strongly recommended for the staff of any intense physical education program with emotionally handicapped children.

The specific sequence and purpose of meetings held during the 1971 program was as follows:

1. The first two meetings of the 1971 program were general familiarity meetings and included the director of training and the team leaders. During the first meeting with the team leaders they were furnished with a verbal and written description of the research project. The theory and purpose of each treatment program was described. The first meeting ended with instructions to read the research project proposal materials which described the treatment programs. The second meeting was primarily a discussion of the questions the team leaders had regarding the inter-relationship of the three treatments and how different activities could be used to attain the purposes of each treatment. During these two meetings the

skills and resources of the team leaders also became more apparent. Two leaders were well trained in both physical fitness and specific coordination activities and one had extensive background in general coordination activites.

2. The third and subsequent meetings dealt with submission and evaluation of specific activities to be included in curriculum for each of the treatment groups. At the third meeting examples of specific activities to be included in each treatment were described. Each team leader was then assigned the task of preparing a written list and description of the activities to be included in one treatment group, that is one leader prepared activities for the physical fitness treatment group, one for the general coordination group, and one for the specific coordination group. To aid them in the task they were provided with references to supplement their own resources. The references supplied are listed as references to this paper. The leader proposed activities were presented at the next meeting. Ideas for additional activities were discussed, activities eliminated based on experiences of other leaders, and modifications suggested based on knowledge of subject capabilities. The director of training participated in these discussions and made decisions regarding whether an activity more appropriately belonged in a different treatment group. This format was followed for five meetings.
3. During the fifth meeting the team leaders selected the other staff members who would be members of their team. This was a joint effort of the team leaders and the director of training in an effort to establish balanced teams which would include people whose

skills would compliment each other. The team leaders were then instructed to hold a series of meetings with their team members to review and expand the specific activities already selected. The director of training and team leaders then met to finalize the selection of activities for each treatment group. A separate meeting of the director of training and team leaders was then held to identify needed equipment and facilities and to finalize general administrative procedures, such as attendance reporting, daily supervision by the team leaders, et cetera.

4. After the activities had been selected and general administrative procedures established two meetings were held with the total staff at the summer training site. The purposes of these meetings were to select treatment areas and make final preparations of facilities and equipments.

The job description for the team leader position was changed from the first year to the second year of the project. During the first year of the project, the team leader directly led a group of subjects and gave occasional supervision and planning leadership to the other members of his team. Direct supervision of all staff was done by the Director of Training. This resulted in the team leaders feeling and acting as only staff members and not assuming a leadership role. Further, the fact that the groups of subjects were separated for training resulted in only occasional supervision by the Director of Training whereas the team leaders would have been in a position to do almost constant direct supervision and planning. Awareness of these factors resulted in a change in the job description of the team leaders for the second year of the project. The team leaders were made aware that they were directly responsible for the supervision of their team.

members. They were not assigned a group of subjects but were expected to do demonstration instruction for staff members experiencing difficulty. Also they were to identify and seek solutions to problem situations regarding subject interaction.

Regularly scheduled in-service meetings were held throughout the 1971 eight week summer program. The team leaders met a minimum of once per week with the Director of Training. Additionally, the separate teams met as a group with their respective team leader at least once per week for purposes of planning activities and discussing the most effective way to program for specific subjects.

Daily activity logs were maintained by each staff member. The logs were organized into three areas for each day: (1) concept to be taught; (2) equipment, teaching approach and class organization to be used; and (3) comments and evaluation of how treatment was received. The first two areas of the daily log were prepared prior to treatment and were approved by the team leaders prior to implementation. The evaluation of the effectiveness of the treatment was added post implementation and submitted to the Director of Training. Activities used by the staff, as recorded on the daily activity logs, are shown as appendix E.

The three teams of staff were rotated through the three treatment groups of subjects. Team one worked with the general coordination treatment group for the first one-third of the summer program, with the physical fitness treatment group for the second one-third of the summer program. The rotation for team two was specific coordination (skill), general coordination, and physical fitness treatment groups. Rotation for team three was physical fitness, specific coordination (skill) and general coordination treatments.

The purpose of the rotation was to negate the effect which a particularly good or bad staff team might have on any particular treatment. During the 1970 program the rotation was done without preparing the children and resulted in a substantial loss for the children since they had established working relations with the previous team and resented the new team members. To counteract this in the 1971 program, each team spent at least two hours with the subjects they would be working with during the two days prior to the rotation. During these visitations the team that was presently in charge introduced them and generally conveyed a feeling of approval as the rotating team and subjects became acquainted. Additionally, the total staff prepared written comments on each student regarding how he functioned, what he liked, did not like, et cetera. After the written comments were exchanged, a general staff meeting was held where the comments were gone over and further elaboration was provided upon request. The procedures used during the second year minimized the stress caused by the rotation and did not result in a noticeable increase in absenteeism. This type of familiarization is highly recommended for any program with emotionally handicapped children when a change of staff is undertaken.

Treatment Procedures for Subjects

One hundred ninety-two male subjects between the ages of six and fourteen were included in the study. Ninety-six subjects were selected for the 1970 program and a different ninety-six for the 1971 program. The subjects had previously been diagnosed as aggressive (64 subjects) hyperactive (64 subjects and withdrawn (64 subjects). The subjects were separated into four groups with an equal number of each of the diagnostic categories being randomly assigned to each group. This resulted in four groups of twenty-four subjects, composed of eight aggressive, eight hyperactive, and eight withdrawn subjects each for 1970 and 1971 program. The four groups were randomly assigned to: (1) control, (2) physical fitness, (3) general coordination, and (4) specific skill treatments.

The control group received pre, post, and retention tests but did not attend the summer treatment program. They were allowed to participate in whatever activities their parents had scheduled for them. This included such things as vactions at the shore, play in the neighborhood, attendance at camps, and in some cases participation in training programs especially planned to improve the academic ability of the child.

The subjects in the three treatment groups (physical fitness, general coordination, specific skill) were transported to the camp daily for five days per week for eight weeks. They arrived at the camp by 10:00 A.M. and departed at 3:00 P.M. Treatment programs were administered daily from 10:00 until 11:00 and from 1:00 until 2:00. From 11:00 until 12:00 subjects in all treatment groups participated together in recreational swimming. Eating took place from 12:00 to 1:00 and all of the groups participated in team games and nature lore activities from 2:00 until 3:00.

During the treatment time the physical fitness group participated in activities selected to improve their physical condition (see appendix E) particularly in the components of strength, endurance, speed, flexibility, agility, and power. Some of the activities which were used to develop these components include:

1. obstacle course running
2. calisthenics
3. weight training
4. cross country running
5. auto tire races
6. games of low organization
7. rope climbing
8. tag games
9. scooter races
10. steal the bacon
11. relay races
12. rope skipping
13. isometric exercises
14. wheel barrel races
15. crabwalk
16. exergenic exercises
17. horizontal ladder
18. trapeze bar work
19. medicine ball
20. parallel bar exercise

The general coordination treatment group participated in activities selected to improve the child's ability to maneuver his body in any desired manner (see appendix E). The method of teaching for this area was more important to the child achieving the goals of the program than were the specific activities used. All activities in this area were taught for positive transfer. For example, when the concept of catching was taught the emphasis was on the mechanical principles of catching such as visual tracking of the object adjusting for expectations of object shape, weight on initial impact, and controlling the object for the next desired use of it. The way these concepts were taught was by constantly mixing the object being caught, i.e. utility ball, ping pong ball, tennis ball, baseball bat, stone, football, bucket, towel, and medicine ball while emphasizing to the child how catching each object involved the same principles. Games were then devised which incorporated the various objects used.

Several general body control concepts were taught. They included: (1) receiving impetus of objects, (2) receiving impetus of self, (3) imparting impetus to objects, (4) imparting impetus to self, (5) balancing of objects, and (6) balancing of self. Many of the activities used in the general coordination program were taken from the Bucks County Public Schools Perceptual Motor Programs published by the Doylestown, Pennsylvania office of the Bucks County Public School System. The activities described in the booklet required some modification to fit the organizing concept used in the general coordination area but proved quite valuable to the staff, one of whom was very familiar with the Bucks County Program.

The specific skill group was taught the skills necessary for successful performance in selected games (see appendix E). In each case the instruction in the fundamental skills culminated in actual participation in the game being taught. The games selected for presentation were: (1) badminton, (2) basketball, (3) bowling, (4) handball, (5) touch football, (6) volleyball, and (7) wrestling. The wrestling unit, which was added after considerable discussion among the staff members, proved to be one of the most popular activities with the children.

The games were modified in relationship to the child's level of ability. The subjects in the specific skill group were separated into three functioning levels of ability and received instruction at a degree of complexity which seemed appropriate for their level. For example, the most advanced subject culminated the basketball unit in basketball games conducted according to official rules but with the basket placed seven feet high. The beginner group of subjects used an eight inch utility ball on a small court, defended their positions in limited zones and used as the goal a basket on a table, placed against a wall.

Summary

Substantial changes were made in the implementation of the evaluation program from the 1970 to the 1971 testing. These changes resulted in more reliable data collection in a more efficient manner from the standpoint of both money and time. The modifications are highly recommended for any program of physical performance evaluation with emotionally handicapped children when a large number of test items are to be administered.

There were also extensive changes between year one and two of the program to increase staff involvement in the project. The changes were largely successful and are recommended for physical education programs with emotionally handicapped children. It is believed that this change was largely due to the changes made in staff role definition and subsequent involvement. The activities taught to the children between the two years were similar but not exactly the same. The major purpose of the research project was to determine the effectiveness of these treatments therefore, major modification in this area would have been considered only on objective information acquired from analysis of the research data.

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PHYSICAL PERFORMANCE
TEST ADMINISTRATION MANUAL*

FOR

RESEARCH PROJECT ON COMPARISON OF THREE METHODS OF PHYSICAL EDUCATION PROGRAMMING FOR EMOTIONALLY DISTURBED CHILDREN

U.S. OFFICE OF EDUCATION GRANT
NUMBER OE - 6 -0 - 70 - 357 (607)

by
Donald Hilsendager
1969 - 1972

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*Directions for commonly used test items (such as Rodger's Physical Fitness Index and Fleishman's Test Items) were taken directly from publicized references on these tests. These references are listed in the back of this manual.

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PROJECT ON
PHYSICAL EDUCATION PROGRAMMING

Name: ______________________ School ______________ Diag.GP. ________ TR.GP. ________
last first

	INITIAL TEST		FINAL TEST		RETENTION TEST	
	Score	Tester	Score	Tester	Score	Tester
1. Date						
2. Birthday age						
3. Height						
4. Weight						
5. Multiplier*						
6. Pull-ups						
7. Push-ups						
8. Arm Strength*						
9. Back Lift						
10. Leg Lift						
11. Left Grip						
12. Right Grip						
13. Lung Capacity						
14. Strength Index						
15. Normal S.I.*						
16. P.F.I.*						
17. Leg Lift(Fleishman)						
18. Extent (Fleishman)						
19. Dynamic Flexibility						
20. Cable Jump(5 Forward)						
21. Cable Jump (10)						
22. Balance-A Test						
23. 600 yd. Run-Walk						
24. 300 yd. Dash						
25. Shuttle Run						
26. 30 yd. Dash						
27. Zig Zag Run						
28. Tapered B.B.						
29. Flex Arm Hang						
30. Curl Up						
31. Squat Jump						
32. Ball Throw						
33. Throw and Catch						
34. Ball Kick						
35. Shot Put						
36. Standing B.J.						
37. Flex Test						
38. Volleyball Volley						
39. Volleyball Serve						
40. Badminton Serve						
41. Basketball Dribble						
42. Handball Serve						
43. Bowling						
44. Kinesthesometer						
45. Mod. Harvard S. T.						

*Computed Score

DRH/cd
5/3/72

TEST ADMINISTRATION DIRECTIONS

Background Information:

Name: Print subject's name.

School: School attended by subject during academic school year.

Diag. Gp. Diagnostic Group; either Aggressive, Hyperactive, or Withdrawn.

Tr. Gp. Treatment Group; either Physical Fitness, General Coordination, Specific Coordination or Control.

NOTE: A new score sheet is to be used for each Administration of the test battery to avoid influence caused by knowledge of previous test scores. However, the scores are to be placed in the appropriate column, i.e. initial test, final test, or retention test.

Numbered Test Data:

1. Date: Day, month, and year test is being administered.
2. Birthdate - age: Day, month and year of birth. Age to test date in total months completed and in years and months completed.
3. Height: Recorded in inches to the nearest half inch.
4. Weight: Recorded in pounds to the nearest whole pound.
5. Multiplier: Computed according to the following formula; Weight in pounds divided by ten plus height minus 60. If height is less than 60 inches it is ignored rather than becoming a minus figure.

$$\left[\frac{\text{Weight}}{10} \quad + \quad (\text{Height} - 60) \right] \quad = \quad \text{Multiplier}$$

6. Pull-ups: The pull-up test is administered from a chinning bar, in taking the pull-up test, the subject hangs from the bar by his hands, using the palm away grip, and then chins himself as many times as he can. In executing the movement, he should pull himself up until his chin is even with his hands, then lower himself until his arms are straight. He should not be permitted to kick, jerk, or use a kip motion. Half-counts are recorded if the

subject does not pull all the way up, if he does not straighten his arms completely when lowering the body, or if he kicks, jerks, or kips in performing the movement. Only 4 half counts are permitted. Counting should be audible to the subject and reasons for half counts clearly given.

7. Push-up:

NOTE: At least 5 minutes must have elapsed since the pull up test was administered to the subject. The push-up test is administered on regular gymnasium parallel bars.

Directions: The bars should be adjusted at approximately shoulder height. The subject should stand at the end of the parallel bars grasping one bar in each hand. He jumps to the front support with arms straight (this counts one). He lowers his body until the angle of the upper arm and forearm is less than a right angle, then pushes up to the straight-arm position (this counts two). This movement is repeated as many times as possible. The subject should not be permitted to jerk or kick when executing push-ups. At the first dip for each subject, the teacher should gauge the proper distance the body should be lowered by observing the elbow angle. He should then Hold his fist so that the subject's shoulder just touches it on repeated tests. If the subject does not go down to the proper bent-arm angle or all the way up to a straight-arm position, half-credit only is given, up to 4 half-credits. Counting should be audible to the subject and reasons for half-counts given clearly.

8. Arm Strength: Arm strength is computed by adding pull ups and push ups and multiplying the sum by the multiplier.

Back Lift: With the feet in the proper position on the base of the dynamometer, the subject should stand erect with the hands on the front of the thighs, fingers extended downward. The tester should then hook the chain so that the bar level is just below the finger tips. The subject should grasp the handle firmly at the ends of the bar, with thumb clenching fingers and with one palm forward and one palm backward. If the subject is in position to lift, the back should be slightly bent at the hips so that he will not completely straighten when lifting, but the legs should be straight with no bend at the knees. The head should be up and eyes directed straight ahead.

It is important not to bend the back too much, as the resultant poor leverage is conductive to a poor lift as well as to the possibility of strain. With the back properly bent, however, there is very little likelihood of injury from lifting.

The subject should lift steadily, the tester encouraging him to do his best. Care should be taken to keep the knees straight. The tester should grasp the subject's hands firmly during the lift.

The subject's feet should be flat on the platform. It is necessary to retest after shortening the chain if the subject attempts to lift by standing on his toes. Any initial lateral away should be immediately checked.

At the end of lifting effort, the back should be almost straight. If not, repeat the test.

10. Leg Lift: Equipment includes a dynamometer, lift bar and canvas belt with a loop at one end.

Directions: The subject should hold the bar with both hands together in the center, both palms down, so that it rests at the junction of thighs and trunk. Care should be taken to maintain this position after the belt has been put in place and during the lift.

The free end of the belt should be looped around the other end of the bar, tucking it in under so that it rests next to the body. In this position, the pressure of the belt against the body and the resultant friction of the free end against the standing part holds the bar securely. The belt should be placed as low as possible over the hips and gluteal muscles.

The subject should stand with his feet in the same position as for the back lift. The knees should be slightly bent, 115 to 124 degrees.

Before the subject is instructed to lift, the tester should be sure that the arms and back are straight, the head erect, and the chest up. These details are of great importance to accurate testing. Beginners will err in results by from 100 to 300 or more pounds if the single detail of leg angle is wrong. Therefore, even experienced testers repeat leg lift tests for most subjects immediately, changing slightly the length of chain--even by twisting if a link seems too great.

Maximum lifts occur when the subject's legs are nearly straight at the end of the lifting effort.

Record the best of two to three tests.

11. Left Grip: 12. Right Grip:

A manuometer, or hand dynamometer, of the rectangular type is used to measure grip strength, both right and left hands being tested.

The tester should take his right hand and place it in the palm of the subject's hand while holding the hand to be tested with his left hand in such a manner that the convex edge of the manuometer is between the first and second joints of the fingers and the rounded edge is against the base of the hand. The thumb should touch, or overlap, the first finger. The dial is to be against the palm.

In taking the test, the subject's elbow should be slightly bent and his hand should describe a sweeping arc downward as he squeezes the manuometer. The hands should not be allowed to touch the body, or any object, while the test is being administered. If they do, the score should not be read at all, and a retest should be given after a short rest period of 30 seconds.

The right hand should be tested first and then the left. Scores should be read to the nearest pound. The best score from two trials is recorded. The indicator should be returned to zero after each test.

13. Lung Capacity:

Lung capacity is measured in cubic inches with a wet spirometer. The spirometer should be equipped with an extra length rubber hose (36 to 42 inches), filled with water to within one inch of the top, and placed at such a height that all subjects can stand erect when beginning the test. A good arrangement for the majority of students is to place the base from four to four and one half feet from the floor. An individual wooden mouthpiece is used for each subject.

Directions: The subject should take one or two deep breaths before the test. Then, after the fullest possible inhalation, he should exhale slowly and steadily while bending forward over the hose until all the air within his control is expelled. Care should be taken to prevent air from escaping through the nose of the subject during the test. If the test is improperly performed, or if, in the opinion of the tester, the subject did not do his best, it should be repeated after an explanation of the precautions necessary to make the test a successful one. The tester should watch the indicator closely to note when it reaches the highest point.

The rubber plug at the base of the spirometer should be removed when lowering the inner can after a test has been administered. Care should be taken in lowering this can so that the water is not spilled. If at any time the inner can should "bubble" and refuse to rise higher with continued blowing into the hose, additional water is required. This situation will occur if there is an insufficient amount of water in the can, which may happen if the water level has been lowered through spilling.

14. Strength Index·

Sum of scores on test items (8) arm strength, (9) back lift, (10) leg lift, (11) left grip, (12) right grip, and (13) lung capacity.

15. Normal Strength Index:

Identified for each subject by use of his sex, age, and weight by referring to Table XXI in the Clarke reference.

16. Physical Fitness Index:

Computed by dividing the subject's Normal Strength Index (test item 15) into his Strength Index (test item 14) and multiplying the answer by 100 to remove the decimal point.

17. Leg Lift (Fleishman):

Test Arrangements: This may be done on a mat, floor, or grassed area. A stop watch is needed.

Instructions: The student lies flat on his back with his hands clasped behind his neck. A partner should hold the examinee's elbows to the ground. The student is told to raise his legs, keeping them straight, until they are vertical, and then to return the to ground. He is to do these leg lifts as fast as he can, doing as many as possible in 30 seconds. The following points should be stressed.

A. Do not rock the body-- the head, small of the back and base of the spine must remain on the ground. The exercise should be a stiff one-two motion.

B. Do not boost the body to get the legs vertical.

C. Elbows must remain flat on the ground.

D. Legs should be kept straight at all times.

Demonstrate the movement. Then instruct the student to try the exercise through two cycles to get the feel of it. Correct errors.

Emphasize the need to go "all out during the short test period" without slowing down.

Then say "Ready: (pause) GO!" During the test make sure legs are raised to the vertical and instructions are followed.

Say "Stop!" exactly at 30 seconds.

13. Extent Flexibility Test (Fleishman):

A. A measuring scale is drawn on a wall. The scale is 30" long and is marked off in half inch intervals from 0" to 30". This scale should be sufficiently wide to take advantage of differences in heights of the subjects.

B. Another line is drawn on the floor, perpendicular to the wall, in line with the 12" mark on the scale.

C. The right handed subject stands with his left side toward the wall, toes touching the line on the floor, feet together and perpendicular to this line on the floor.

D. The subject stands far enough from the wall so that he can just touch the wall with his left fist when his arm is held horizontal from the shoulder.

Instructions: After assuming the position described above, the student keeps his feet in place and extends his right arm straight out to the side, at shoulder height. His palm faces the floor with fingers extended and together. From this position he twists clockwise (around his back), as far as possible, so that he touches the scale on the wall with his right hand. During this movement, the examiner, or an assistant, places his foot along side the student's right foot to keep the student's feet in place.

Have the student make one practice try to get the feel of it, and correct any errors in his procedure. The second try counts.

Scoring: Record the farthest point reached (in inches) and held (for at least two seconds), as measured on the scale.

Additional Guidance:

For left-handed subjects, use the alternate scale and reverse the directions of movement.

19. Dynamic Flexibility Test (Fleishman):

The subject stands with his back to the wall and far enough from the wall that he can bend over without hitting the wall with his buttocks. His feet should be shoulder width apart. Directly behind the middle of his back, at shoulder height, mark an "X" on the wall (use chalk or tape). Mark another "X" on the floor between the student's feet. A stop watch is needed.

Instructions: On the signal "Go" the student bends and touches the "X" between his feet with both hands and then rises, twists to the left, and touches the "X" on the wall with both hands. This counts as one cycle.

In the next cycle, the student repeats this, except he twists to his right, continuing to alternate the side to which he twists in each cycle.

The instructor should demonstrate three such cycles, emphasizing speed.

Scoring: Record the number of cycles completed in 20 seconds.

20. Cable Jump Test (5 forward)

Testing Arrangements: A 24 inch length clothes line is required.

Instructions: The subject is told to hold the rope in front of him with one hand grasping each end. Note that approximately 4 inches of rope are covered by each hand, exposing about 16 inches between his hands. Just the ends of the rope should provide outside the closed fists. He is not to hold the rope stretched out, but should let it hang loose. Holding the rope in this way, the student is required to jump over the rope without loosening his grip from it.

The object here is to measure a coordinated performance. It should be stressed to the student that he:

A. jumps (both feet simultanously) over the rope, through his arms;
B. lands on his feet
C. does not hit the rope with his feet, or lose hold of it while jumping, and
D. does not lose his balance when landing.

Unless the subject meets all of these requirements he has not made a correct jump.

Scoring: Record number of correct jumps out of five attempts.

21. Cable Jump (10)

The subject jumps forward over the cable as in the Fleishman Cable Jump (test item 20) but after each jump forward the subject must jump over the cable backwards. Five trials are attempted forward and five backward. The score is the number of successful jumps.

22. Balance - A Test:

Testing Arrangements: The balance rail is a piece of wood 1 1/2" high 3/4" wide, and 24" long. This piece of wood is mounted to a base board. A stop watch is needed.

Instructions: The subject is told that he is to balance on the rail using the preferred foot, with the long axis of his foot parallel to the long axis of the rail. He is given a practice trial with his eyes open. He is told that his score is the length of time from when he says "Go" until he touches the floor with any part of his body or removes either hand from his hips. He first places his hands on his hips and stands up on the rail. When the student has his balance and wants to start the trial, he says "Go". The administrator then begins timing the subject. He may not touch the floor with any part of his body, nor remove either hand from his hips. After the practice trial, the procedure is repeated with the eyes closed. The examinee must close his eyes at the instant he says "Go". He is administered two separate test trials with eyes closed.

Scoring: The number of seconds the student maintains his balance for each trial is recorded sepåratetly and added together for a total score.

If he reaches 20 seconds without having lost his balance, he is told to stop, and a "20" is recorded for that trial. If he opens his eyes, removes either hand from his hips, or touches the floor, stop the trial and record the time.

23. 600 Yard Run-Walk·

Testing Arrangements: This is typically done outdoors. A square area, 25 yards on each side is used and six laps comprise the 600 yards.

Stop watches are needed, the number depending on how many students are run together. For administrative and scheduling reasons, it will usually be necessary to run a number of subjects together. One observer with two stop watches is used to clock two subjects as each crosses the finish line.

Instructions: The subjects are told that the object is to cover the distance in the shortest possible time. He may intersperse his running with walking but he must try his best to finish as quickly as possible.

Scoring: Record the time, to cover the distance, in total elapsed seconds.

24. Three Hundred Yard Run:

Equipment: stop watch, four course markers

Directions: Markers are used to outline a square one hundred yard course which the subject runs for three laps. When the starting signal (Ready? Go!) is given, the subject is to run the the course as fast as he can, and the number of seconds elapsed before he crosses the finish line is recorded to the nearest tenth of a second.

25. Shuttle Run:

Testing Arrangements: Two parallel lines, 20 yeards apart, should be marked off. This can be run on a track surface, but is suitable for floor, macadam, or other ground surfaces.

On observer is stationed at the start line and one at the finish line. The observer at the finish line has a stop watch.

Instructions: It is preferrable to have one subject run at a time. At the start he stands behind the short line, with one toe at the line. He is told that at the command "Go" he is to run to the opposite line, 20 yards away, touch the ground on the far side of it with one foot (either one) return to the start line and repeat. He is told to cover the one way distance five times for a total of 100 yards. On his last lap he is to go "all out" to cross the finish line standing up. The object is to cover the distance as fast as possible. The observers at each end note that the student has touched over the line. They also watch that the student does not get confused and (a) stop short, not running five times, or (b) treat the last lap as if he was to turn around again. The examiner should demonstrate the turn around movement encouraging efficiency (that is, a small turning radius). Turns have been found to average under 6 feet in radius. If the student is doing something which grossly slows him up at the turns, the observer should encourage him to turn more quickly.

Scoring: The time to cover the 5 laps (5 X 20 = 100 yards) is recorded to the nearest tenth of a second.

26. Thirty Yard Dash:

Equipment: Stop watch, starting and finish line markers

Directions: When the starting signal (Ready? Go!) is given, the subject should sprint from the starting line to the finish line. The number of seconds the subject takes to run the thirty yards is recorded to the nearest tenth of a second. The timer stands at the finish line and starts the stop watch on the starting movement of the subject rather than any movement or sound of the starter.

27. Zig Zag Run:

Equipment: Stop watch, four folding chairs.

Description of the Course: A six inch X is placed on a wall four feet from the floor. A folding chair is placed on the floor six feet from the wall. A second chair is placed six feet behind the first chair, a third chair six feet behind the second, and a fourth six feet behind the third chair. A one foot starting line is placed six feet behind the fourth chair.

Directions: The subject stands behind the starting line and on the signal (Ready? Go!) he runs on the right side of the nearest chair, to the left of the next chair, to the right side of the nearest chair, to the left of the next chair, to the right of the following chair, to the left of the last chair, touches the x on the wall and returns through the chairs in the same zig zag manner. The subject's score is the time it requires him to run the course and return across the starting line. The time is recorded to the nearest tenth of a second. He is given two trials and the best time is recorded.

28. Tapered Balance Beam:

Equipment: tapered balance beam.

Description of tapered balance beam:

The 2 inch thick wooden beam is twenty feet long. Both sides are cut at a seventy degree angle with the top surface as the narrowest surface. The top surface is four inches wide at one end of the beam and tapers to approximately one sixteenth of an inch fifteen feet from the beginning of the beam. The last five feet have a top surface width of approximately one sixteenth of an inch. Both sides of the beam are marked in consecutive inch intervals beginning from the wide end. To strengthen the beam a twenty foot two by four inch board is screwed to its bottom surface. The beam can be made easily transportable by hinging it at five foot intervals.

Directions: The subject begins standing on the wide end of the beam with one foot directly ahead of the other and with the heel of the front foot in contact with the toes of the rear foot. The subject is to walk forward along the tapered balance beam as far as possible by placing the heel of the foot which is taking the step against the toes of the supporting foot on each step. Both feet must be pointing straight along the beam. The greatest beam distance traveled in either of two trials before he falls from the beam is recorded as the subject's score. The subject may be assisted onto the beam, but no further. Tennis shoes or sneakers are worn by the subject.

29. Flexed Arm Hang:

Equipment: Horizontal bar, stop watch, chair

Directions: The subject stands on a chair and grasps a horizontal bar in a flexed arm position with the palms toward him grip and with his chin above the bar. On the signal (Ready? Go!) the chair is removed and the watch started. The subject's score is the number of seconds (to the nearest tenth) he can keep his arms flexed more than ninety degrees.

30. Curl Up (max. 50):

Equipment: Mat

Directions: The subject begins in the supine position with his knees flexed and his hands behind his head (fingers do not need to be interlocked). The tester holds the ankles of the subject to keep the subject's soles in contact with the mat. The subject must sit up to the vertical position on each curl up. The number of curl ups completed without resting or bringing the hands away from the head is the subject's score. Any subject who completes 50 curl ups is stopped at that time and given the maximum score which is 50.

31. Squat Jump:

Equipment: Mat

Directions: The subject begins from a crouched position with his arms on the outside of his knees and his hands touching the mat. The subject jumps into the air to an approximate height of four inches as he extends his legs and trunk. When landing from a jump, the subject continues into the crouched position for the next jump. The score is the number of correct jumps the subject can perform without stopping.

32. Ball Throw:

Equipment: Twelve inch softball, throwing area marked at ten yard intervals, steel measuring tape.

Directions: The subject must use a running approach to the restraining line to throw the 12 inch softball as far as possible. The approach may be of any length and the subject may use any one handed throwing motion he chooses but an overhand throwing is demonstrated by the examiner. Measurement is from where the ball first hits the ground to the restraining line. The score is taken from the best of two throws and is recorded to the nearest half foot.

33. Throw and Catch:

Equipment: Eight and one half inch utility ball, wall target, floor markings.

Description of Wall Target and Floor Markings:

Five 2 foot squares are marked on the floor. The first square is three feet from the wall and the other four are behind each other at a distance of one foot each. A target is marked on a flat wall surface with half inch tape. The target is three feet square and the bottom is four feet from the floor. The center of the target is an inner square ten inches from each of the sides.

Directions: The subject begins with both feet inside of the first (nearest the target) floor square and throws the $8\frac{1}{2}$ inch utility ball against the target with an underhand motion and attempts to catch it in the air on the rebound while keeping both feet inside the square. He is given two practice trials from the first square followed by three scored trials from each of the five squares. Each throw is scored two for hitting in or on the center target square and two for a successful catch with both feet in the floor square. One point is awarded for throwing the ball in or on the outer wall square and one point is also awarded for catching the ball in the air after stepping outside of the floor square. If the subject steps out of the floor square when throwing the ball, he is given a retrial. The subject's score is the sum of points from the fifteen throws.

34. Ball Kick:

Equipment: Soccer ball, wall target, floor markings.

Description of Wall Target and Floor Markings:

A five foot high and ten foot wide target is marked on a flat wall surface with half inch tape. The target area is marked into three rectangles with the second rectangle three feet high and six feet wide. The center rectangle is one foot high and two feet wide. A five is marked in the small target area, and three in the middle area, and a one in the largest area. There are three lines placed on the floor. Each floor line is three feet long and parallel to the wall target. The first floor line is ten feet from the wall, the second is twenty feet, and the third is thirty feet from the wall target.

Directions: A soccer ball is placed on the first (10 foot distance) floor line, and the subject attempts to kick the ball into the smallest target area. The subject is given two practice kicks and three scored kicks from each of the floor lines. Each trial is scored according to the number of the target area in which it hits. The higher value is awarded when the ball hits on a line. The subject score is the sum of the nine kicks.

35. Shot Put·

Equipment: Four pound shot, fifty foot steel tape

Directions: The subject begins with the four pound shot held in one hand with the arm flexed and with both feet behind the restraining line. He then puts the shot as far as he can. He is encouraged to rotate his upper body as he throws. Measurement is taken in inches and measures from where the shot first touches the ground back to the back of the restraining line. The subject's score is the best of two trials.

36. Standing Broad Jump:

Equipment: Mat marked with a restraining line and a measurement line marked in inches on athletic tape.

Directions: The subject begins with the toes of both feet directly behind the restraining line, and with his body in a crouched position with both arms extended backward. He then swings his arms forward as he jumps forward as far as possible. Both feet must leave the mat simultaneously. Measurement is taken in inches from the back of the starting line to the point on the mat which is contacted by the body part which is nearest to the restraining line and in contact with the mat after the subject lands. The best of two jumps is recorded as the subject's score.

37. Flex Test:

Equipment: Flex Tester.

Description of Flex Tester:

The flex tester consists of a (1) foot board, (2) guide rail, (3) sliding block, (4) sliding caliper, and (5) handle. The foot board and guide rail are made of one inch boards 12 inches wide. The foot board is eighteen inches long and the guide rail is thirty inches long. The foot board is nailed to the end of the guide rail to form a T. This results in the foot board and guide rail both being twelve inches high when the T formed by them is laid on the floor.

The sliding block is made from a four by four inch piece of wood six inches long. A channel is cut lengthwise into the

the bottom surface of the block. The channel is one inch deep and one inch wide and is equal distance from each side of the block. Note: this channel must be wide enough for the block to slide freely along the top surface of the guide rail Two eye screws are turned into the top of the sliding block. The screws are one half inch from the end of the block with one screw near one end and the other at the opposite end. The eye of the screw has a three fourths inch diameter. The sliding caliper is a wooden dowel thirty six inches long and one half inch diameter. A small hole is drilled through the dowel one half inch from one end and used as the zero point to mark the rest of the dowel at one half inch intervals. The dowel is placed through the openings of the eye screws of the sliding block. A round handle one and one half inches in diameter and one foot long is fastened to the dowel at a ninety degree angle by drilling a one half inch hole into the handle and inserting the dowel end into the handle. This results in a T formation with the handle as the top of the T. The dowel end without the screw hole is the one which is glued into the handle. A screw is placed into the small hole of the dowel to prevent the dowel from being withdrawn through the eye screw of the sliding block.

The channel of the sliding block is placed on the guide rail. The handle of the sliding caliper faces in the same direction as the foot board.

Directions: The subject sits on the floor with his legs extended and the soles of his foot against the foot board of the Flex Tester. He grasps the handle bar of the Flex Tester and reclines into the supine position with his arms extended toward his feet.

(Note: This move automatically sets the starting position of the marker in relationship to the sliding caliper.) On the signal (Sit up. Keep your knees straight and push the handle bar as far as you can before you release it), the subject follows the directions and pushes the handle bar as far through the marker eye screw as possible. The number of inches the subject has pushed the sliding caliper through the marker eye screw is read directly off of the sliding caliper and recorded to the nearest half inch as the subject's score.

38. Volleying Test:

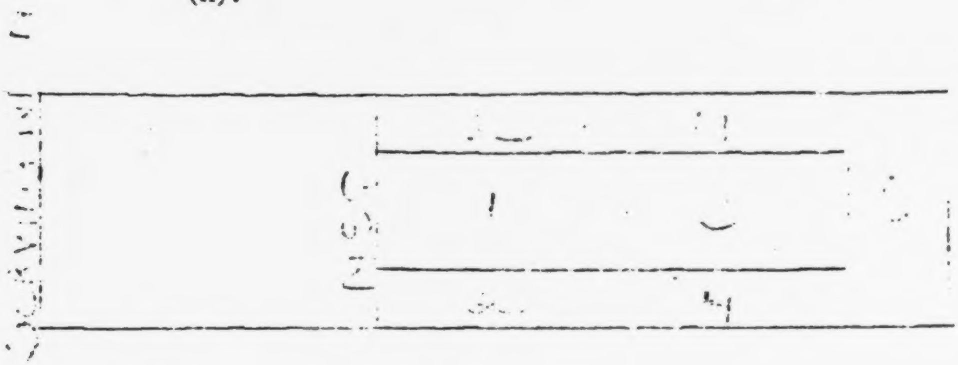
Equipment: Eight and one half inch diameter utility ball, stop watch, and floor and wall markings. Court markings are as follows: (1) a line 10 feet long marked on the wall at 7 feet 6 inches from the floor, (2) a line on the floor opposite the wall marking, 10 feet long and 3 feet from the wall.

Directions: The subjects stands behind the 3 foot line and with an underhand movement tosses the ball to the wall, and then volleys the ball repeatedly against the wall above the 7'6" line for 30 seconds. The ball may be set up as many times as desired or necessary; it must be retrieved by the subject and put into play at the 3 foot line as at the beginning. The score consists of the number of times the ball.is tossed or clearly batted from behind the 3 foot line to the wall above or on the 7'6" line. The best score of three trials should be recorded. Thirty second rest periods between trials should be allowed.

39. Serving Test:

Equipment: Eight and one half inch utility ball, volleyball standards and net plus special court markings.

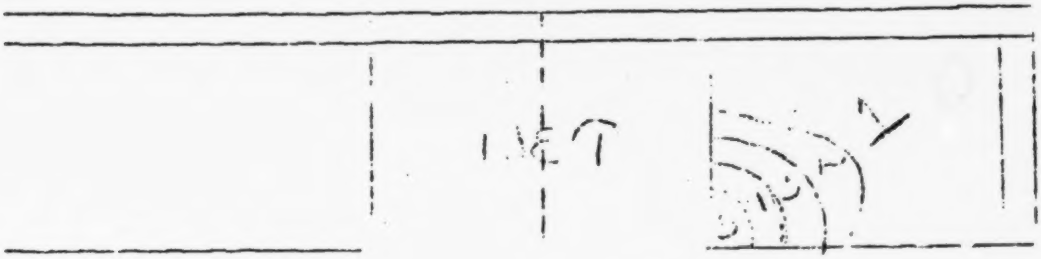
Special court markings are as shown in the figure presented below: (A) chalk line across court 5 feet inside of and parallel to end line. (B) Chalk line across court parallel to and 12½ feet from the line under the net. (C) Chalk line 5 feet inside of and parallel to each side line, extending from line under the net to line (A).



Directions: After two practice serves the subject serves ten times using an underhand legal volleyball serve. Each serve is scored according to the value of the target area in which the ball lands, (see above diagram). A ball landing on a line separating two areas is given the highest value. A ball landing on a side or the end line scores the value of the area adjacent. Trials in which foot faults occur score zero. The total number of points scored during the 10 trials is recorded as the subject's score.

40. Badminton Serve Test:

Equipment: Badminton racket, 12 long flight badminton birds, badminton standards and net, clothesline rope, and special court markings. The target is diagrammed (on the next page) and described as follows: (a) A clothesline rope is stretched 20 inches directly above the net (which is 5' high it is center) and parellel to it. (b) A series of four arcs is drawn within the right service court at distances of 22 inches, 30 inches, 38 inches and 46 inches from the intersection point of the short service line and the center line (the use of different-colored lines helps in scoring).

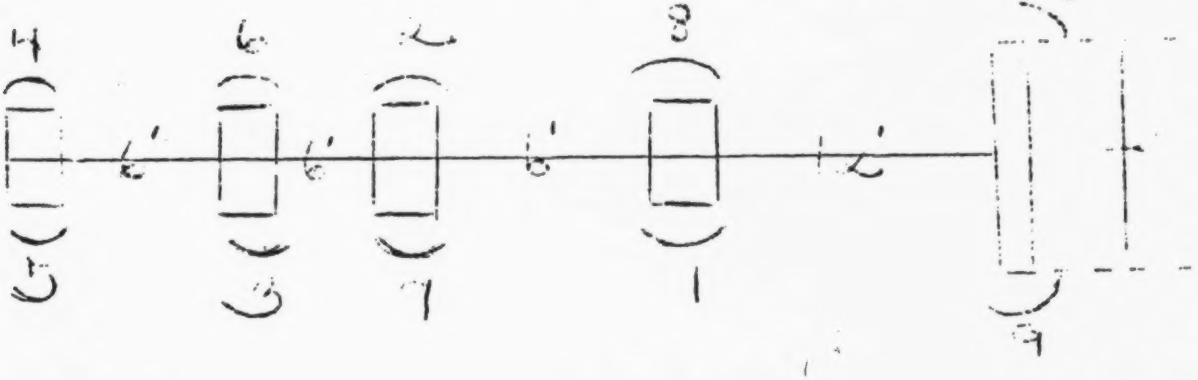


Directions: The subjects serves (only legal badminton serves allowed) 20 birds at the target as diagrammed above.

Scoring: Zero is recorded for each trial that fails to go between the rope and the net or that fails to land in the service court for the doubles game. Score each of the other birds as shown in the figure. Any bird landing on a line dividing two scoring areas shall recieve the higher score. The score of the entire test is the total of 20 trials.

41. Basketball Dribble:

Equipment: Basketball, stop watch and four chairs. The four chairs are placed in a line 6 feet apart, with a distance of 12 feet from the starting line to the first hurdle.



Directions: The subject starts from one end of the starting line (which is six feet long), dribbles around through the chairs and back to the other end of the starting line.

Scoring: The number of zones passed in 30 seconds, as shown in the diagram (shown on page 23).

42. Handball Serve:

Equipment: Offical large handball and three fifteen foot long lines. The three fifteen foot long lines are marked on the floor parallel and ten, twelve and fourteen feet from a flat wall surface.

Directions: The subject drops a large official handball to the floor and on the bounce hits it so that the ball rebounds into the target area. Ten to twelve feet yields one point, twelve to fourteen feet yields three points. Over fourteen feet scores five points. If the ball is beyond the side of the fifteeen foot lines it counts zero. The score is the total number of points scored during five trials.

43. Bowling:

Equipment: Bive inch diameter utility ball and floor and wall markings.

Directions: The subject uses an underhand motion to roll a five inch utility ball into a wall target from a distance of twenty feet. The dimensions and score values of the target are the same as for the ball kick test (item 34). The ball must be rolling on the floor at the moment it contacts the wall or no points are awarded. The score is the total number of points scored during five trials.

44. Kinesthesiometer

Equipment: Kinesthesiometer, produced by Lafayette Instrument Company, Lafayette, Indiana.

Directions: The subject is seated at a table with the elbow of his right arm on the back edge of the quadrant of the kinesthesiometer and his arm extending along the quadrant with the center screw between the middle and third finger, with his palm down and the indicator pointing at zero. The zero radius of the quadrant should be parallel with the subject's chest. The subject is then blindfolded or a clip board held under his chin so he can not see the kinesthesiometer. The tester moves the quadrant, with the subject's arm on it, to left 45 degrees and tells the subject "I am going to move your arm back to the starting point and when I tell you to move it I want you to return to where it is right now." The tester moves the quadrant back to the zero position and tells the subject "Move your arm back to where I moved it before." The number of degrees which the subject exceeds 45 degrees is recorded as his score with a plus sign. The number of degrees which the subject is short of 45 degrees is recorded as his score but with a minus sign. This procedure is followed for five trials each for left 45 degrees and left 90 degrees. The entire procedure is repeated with the left arm moving to the right 45 degrees and right 90 degrees. Two total scores are calculated; total score of the 20 trials without consideration of the plus and minus signs, and total score of the 20 trials with consideration of the sign for each trial.

45. Modified Harvard Step Test:

Equipment: One stop watch, one 14 inch high bench and one metronome

Directions: The subject stands directly in front of and facing the bench. The metronome is on a table behind the bench and in sight of the subject. The metronome is set at a cadence of 120. On the signal of the tester "Up!" he places one foot on the bench. On the second signal of "Up!" he places the other foot on the bench and stands erect. The subject should keep his back straight throughout the test. On the signal "Down" the subject steps one foot back to the floor and on the second "Down" steps the second foot to the floor. This completes one of the 30 cycles which are required per minute to maintain the 120 metronome cadence.

The subject continues the cadence for 3 minutes unless he is forced to stop sooner by exhaustion. The duration of his maintenence of the cadence is recorded in seconds. Upon completion of the test the tester calls "Stop" and the subject sits in a chair. The subject's pulse is counted from one to one and one half minutes, two to two and one half, three to three and one half minutes after exercise. The score is calculated according to the following formula:

$$\text{Fitness Index} = \frac{\text{Duration of exercise in seconds X 100}}{\text{2 X sum of the pulse counts in the 3 recovery periods}}$$

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APPENDIX B

Comparison of Published Test Reliability Coefficients Found With "Normal" Subjects and Reliability Coefficients Found With Subjects Used In The Present Investigation.

Test Item	Reliability Found With "Normal" Subjects	Reliability Found With Emotionally Disturbed Subjects
Pull-ups	.91	.804
Push-ups	.90	.768
Back Lift	.88	.920
Leg Lift	.86	.853
Left Grip	.90	.851
Right Grip	.92	.708
Lung Capacity	.97	.734
Leg Lift (Fleishman)	.89	.557
Extent Flexibility (Fleishman)	.90	- .013
Dynamic Flexibility (Fleishman)	.92	- .285
Cable Jump (5 forward)	.70	.668
Cable Jump (10)	.88	.583
Balance - A test	.82	.388
600 Yard Run-Walk	.80	.904
300 Yard Dash	--	.409
Shuttle Run	.85	.829
30 Yard Dash	--	.126
Zig Zag Run	.84	.203
Tapered Balance Beam	.75	.862
Flexed Arm Hang	.77	.588
Curl-up	.72	.616
Squat Jump	--	.879
Ball Throw	.93	.933
Throw and Catch	.84	.832

Chart cont'd

Test Item	Reliability Found With "Normal" Subjects	Reliability Found With Emotionally Disturbed Subject
Ball Kick	.83	.587
Shot Put	--	.704
Standing Broad Jump	.90	.955
Flex Test	--	.494
Volleyball Volley	.78	.668
Volleyball Serve	.68	.911
Badminton Serve	.77	.874
Basketball Dribble	.78	.836
Handball Serve	--	.530
Bowling	--	.153
Kinesthesometer (Direction Differentiated)	---	.344
Kinesthesiometer (Direction Undifferentiated)	--	.145
Modified Harvard Step Test	--	.378

APPENDIX C

COMPARISON OF SELECTED PHYSICAL EDUCATION PROGRAMS ON THE PHYSICAL PERFORMANCE OF DIFFERENTIALLY DIAGNOSED EMOTIONALLY HANDICAPPED CHILDREN*

by

Donald Hilsendager, DPE
Temple University
Philadelphia, Pennsylvania

Lester Mann, Ph.D.
Montgomery County Intermediate Unit
Norristown, Pennsylvania

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National AAHPER Convention
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*Collection of data for the investigation was supported by grant NO. OE - 6 - 0 - 70 - 357 (607) from the U.S. Office of Education

COMPARISON OF SELECTED PHYSICAL EDUCATION PROGRAMS ON THE PHYSICAL PERFORMANCE OF DIFFERENTIALLY DIAGNOSED EMOTIONALLY HANDICAPPED CHILDREN[*]

Donald Hilsendager, Temple University:
Lester Mann, Montgomery County Intermediate Unit.

Introduction

Research on the effect of physical education programs on emotionally handicapped children is practically non existent. The recommendations regarding physical education programming for these children has typically been based upon subjective observations and research on "normal" subjects. Three types of programs commonly used with normal children are: (1) programs designed to improve the physical conditioning of the subject (these include such activities as running, climbing, lifting, and calisthenis); (2) programs to improve the general coordination of the subjects (these programs, which are frequently referred to as movement education, began in Europe but are presently used by many elementary schools in the United States); and (3) specific skill programs which focus on the teaching of skills specific to selected activities such as basketball, volleyball, tumbling, and dance. Can the physical performance of emotionally handicapped children be improved through participation in these types of programs? Are there any differences between these programs in the factors of physical performance which they most readily develop?

Purpose

The purpose of the study was to determine the effect of three types of physical education programs on the physical performance of three groups of differentially diagnosed emotionally handicapped children. The three types of physical education programs were physical fitness, general condition, and specific skill. The emotionally handicapped diagnoses included were aggressive, hyperactive, and withdrawn.

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[*] Collection of data for the investigation was supported by grant No. OE - 6 - o - 70 - 357 (607) from the U.S. Office of Education

Procedures

Subjects: Students in the Montgomery County Public School system special education classes were tested by psychologists to diagnose the nature of their emotional handicap. Male students between the ages of 8 and 14 who were diagnosed as either aggressive, hyperactive, or withdrawn were randomly assigned to four groups with an equal number (24) of subjects being drawn from each diagnostic category. Ninety-six subjects were selected for the 1970 program and a different ninety-six were selected for the 1971 program. The four groups of subjects were randomly assigned to (1) physical fitness activities (2) general coordination activities, (3) specific skill activities or (4) control.

Staff Qualifications and Training: The staff was composed of male physical education teachers. Approximately one-third of the staff had experience in working with emotionally handicapped children. Each year at least three of the staff had done graduate work beyond the master's degree level. Four staff members who worked in the 1970 program were rehired for the 1971 program.

It was required that the staff participated in the initial testing program. Exceptions to this requirement were made during the 1971 program for two staff members who were employed full time as physical education teachers for special education students in the public schools. The test participation requirement furnished the staff with experience in working with emotionally handicapped children. It further enabled the staff to see the specific children they would be working with and to view their performance under standardized conditions.

The staff was organized into three teams, one for each experimental treatment group, each with an experienced team leader. The team leaders held a series of meetings alone and with the investigator during the winter of 1971 in preparation for the summer program. The purposes of these meetings were to select the members of each staff team, plan each specific activity for each day of the program, identify needed facilities and equipment, and to establish general administrative procedures. A primary purpose of the meetings was to develop in the team leaders a sense of identity with, and importance of, the total project.

Regularly scheduled in-service meetings were held throughout the 1971 eight week summer program. The team leaders met once per week with the investigator. Additionally, the separate teams met as a group with their respective team leader at least once per week for purposes of planning activities and discussing the most effective way to program for specific subjects.

Daily activity logs were maintained by each staff member. The logs were organized into three areas for each day: (1) concept to be taught· (2) equipment, teaching approach and class organization to be used; and (3) comments and evaluation of how treatment was received. The first two areas of the daily log were prepared prior to treatment and were approved by the team leaders prior to implementation. The evaluation of the effectiveness of the treatment was added post implementation and submitted to the investigator.

The three teams of staff were rotated through the three treatment groups of subjects. Team one worked with the general coordination treatment group for the first one-third of the summer program, with the physical fitness treatment group for the second one-third and with the specific skill treatment group for the final third of the summer program. The rotation for team two was specific coordination, general coordination, and physical fitness treatment groups. Rotation for team three was physical fitness, specific skill, and general coordination treatments.

The purpose of the rotation was to negate the effect which a particularly good or bad team of staff might have on any particular treatment. During the 1970 program the rotation was done without preparing the children and resulted in a substantial loss of subjects from the program. The children had established working relations with the previous team and resented the new team members. To counteract this in the 1971 program, each team spent at least two hours with the subjects they would be working with during the two days prior to the rotation.

During these visitations the team that was presently in charge introduced them and generally conveyed a feeling of approval as the rotating team and subjects became acquainted. Additionally, the total staff prepared written comments on each subject regarding how he functioned, what he liked, did not like, et cetera. After the written comments were exchanged, a general staff meeting was held where the comments were gone over and further elaboration was provided when requested.

Treatments. Treatment programs were implemented daily for an eight week period during the summers of 1970 and 1971. The 1971 program was a replication of the 1970 program but included different subjects.

The control group received all tests but did not attend the summer treatment program. They were allowed to participate in whatever activities their parents had scheduled for them. This included such things as activities at the shore, play in the neighborhood, attendance at camps, and in some cases participation in training programs especially planned to improve the academic ability of the child.

The subjects in the three treatment groups (physical fitness, general coordination, specific skill) were transported to the Buttonwood Farms Summer camp daily for five days per week for eight weeks. They arrived at the camp by 10:00 A.M. and departed at 3:00 P.M. Treatment programs were administered daily from 10:00 until 11:00 and from 1:00 until 2:00. From 11:00 until 12:00 subjects in all treatment groups participated together in recreational swimming. Eating took place from 12:00 to 1:00 and all of the groups participated in team games and nature lore activities from 2:00 until 3:00.

During the treatment time, the physical fitness group participated in activities selected to improve their physical condition; particularly in the components of strength, endurance, speed, flexibility, agility and power. Some of the activities which were used to develop these components were:

1. Obstacle course running
2. Calisthenics
3. Weight training
4. Cross country running
5. Auto tire races
6. Games of low organization
7. Rope climbing
8. Tag games
9. Scooter races
10. Steal the bacon
11. Relay races
12. Rope skipping

13. Isometric exercises
14. Wheel barrel races
15. Crabwalk
16. Exergenic exercises
17. Horizontal ladder
18. Trapeze bar work
19. Medicine ball
20. Parallel bar exercise

The general coordination treatment group participated in activities selected to improve the child's ability to manuever his body in any desired manner. The method of teaching for this area was more important to the child achieving the goals of the program than were the specific activities used. All activities in this area were taught for positive transfer. For example, when the concept of catching was taught the emphasis was on the mechanical principles of catching such as visual tracking of the object, adjusting for expectations of object shape and weight, giving with the object on initial impact, and controlling object for next desired use of it. The way these concepts were taught was by constantly changing the object being caught, i.e. utility ball, ping pong, tennis ball, baseball bat, stone, football, bucket, towel, and medicine ball; while emphasizing to the child how catching each object involved the same principles. Games were then devised which incorporated the various objects used.

Several general body control concepts were taught. They included (1) receiving impetus of objects, (2) receiving impetus of self, (3) imparting impetus to objects, (4) imparting impetus to self, (5) balancing of objects, and (6) balancing of self. Many of the activities used in the general coordination program were taken from the Bucks County Public Schools Perceptual Motor Programs published by the Doylestown, Pennsylvania office of the Bucks County Public School System. The activities described in the booklet required some modification to fit the organizing concept used in the general coordination area but were believed valuable the staff.

The specific skill group was taught the skills necessary for successful performance in selected games. In each case the instruction in the fundamental skills culminated in actual participation in the game being taught. The games selected for presentation were: (1) badminton, (2) basketball, (3) bowling, (4) handball, (5) touch football, (6) volleyball, and (7) wrestling.

The games were modified in relationship to the child's level of ability. The subjects in the specific skill group were separated into three functioning levels of ability and received instruction at a degree of complexity deemed appropriate for their level. For example, the most advanced subjects culminated the basketball unit in basketball games similar to official rules but with the basket rim placed at a height of seven feet. The beginner group of subjects used an eight inch utility ball on a small court, defended their positions in limited zones and used as the goal a basket on a table placed against a wall.

Testing Program. Each year a battery of physical performance tests was administered to the subjects prior to and after the eight week treatment programs. An additional testing period was added two days after the post tests for the second year. The data from the additional test period were used to compute reliability coefficients. The second year test battery included four new test items; badminton serve, basketball dribble, handball serve and target bowling. The total test battery included the following items:

1. height
2. weight
3. pull ups
4. push ups
5. arm strength
6. back lift
7. leg lift
8. left grip
9. right grip
10. lung capacity
11. strength index
12. physical fitness index
13. leg lift (Fleishman)
14. extent flexibility
15. dynamic flexibility
16. cable jump (5)
17. cable jump (10)
18. balance-A test
19. 600 yard run
20. 300 yard run
21. shuttle run
22. 30 yard dash
23. zig zag run
24. tapered balance beam
25. flexed arm hang
26. curl up
27. squat jump
28. ball throw
29. throw and catch
30. ball kick
31. shot put
32. standing broad jump
33. flex test
34. volleyball volley
35. volleyball serve
36. badminton serve
37. basketball dribble
38. handball serve
39. target bowling
40. kinesthesiometer (Direction differentiated)
41. kinesthesiometer (Direction undifferentiated)
42. modified Harvard Step Test

A test manual of directions was developed and used to train testers and be available to them during testing. Note: the manual is available free of charge upon request to Donald Hilsendager, Department HPERD, Temple University, Philadelphia, Pennsylvania.

Preliminary Results

Significance of difference between the treatment groups was determined by the F-test and analysis of covariance. The final test scores were adjusted for initial test score differences and the .05 level of confidence used as the significance criterion.

The IBM 360-75 computer at the University City Science Center was used with the MANOVA program from the University of Miami Statistical Package to complete the covariance analyses. The Control Data Corporation 6400 computer with the BIOMED 02R at Temple University was used to compute the reliability coefficients.

Significant differences were found on five of the 1970 and seven of the 1971 variables. See Tables 1 and 2. However, nonsignificant differences were found for 31 of the 1970 and 33 of the 1971 variables. See Tables 3 and 4. Reliability coefficients ranged from .013 to .955. See Tables 1-4.

Discussion

The fact that significance was found with such a limited number of tests and that a pattern, i.e. physical performance factor or anatomical area, is not apparent in these tests raises the questions as to whether they might be chance occurances. If they are not chance occurances further study is needed to identify what characteristics these tests have in common. Particularly, this should be done for the three items which were significant in the 1970 program and the 1971 replication; i.e. shuttle run, throw and catch, and volleyball volley.

Regardless of whether the significances which were found were chance occurances, the question remains as to why a large number of significant test items were not found following the physical education programs. Some of the possibilities are:

1. The extreme variability of intersubject performance would have necessitated a very large change for significance to be found. High intersubject variability would contribute to inflated reliability coefficients and mask intrasubject variability. However, high intersubject variability would tend to set a high standard for between group changes.

TABLE 1

COMPARISON OF ADJUSTED MEANS FOR 1970 PROGRAM TEST ITEMS WHERE .05 LEVEL SIGNIFICANCE OF DIFFERENCE WAS FOUND

Factor	Test Item	Treatment				F	Reliability
		Physical Fitness	General Coordination	Specific Coordination	Control		
Agility	*Shuttle Run	27.169	31.370	29.666	28.276	3.011	.829
Muscular Endurance	Flexed Arm Hang	4.679	10.221	14.974	11.615	5.040	.583
Muscular Endurance	Curl Up	15.456	20.876	18.986	30.776	3.808	.616
Coordination	Throw &Catch	31.541	29.653	32.375	27.137	2.625	.882
Coordination	Volleyball Volley	1.251	2.050	2.960	.835	2.760	.668

*Low Score Indicates Superior Performance

TABLE 2

COMPARISON OF ADJUSTED MEANS FOR 1971 PROGRAM TEST ITEMS WHERE .05 LEVEL SIGNIFICANCE OF DIFFERENCE WAS FOUND

Factor	Test Item	Treatment				F	Reliability
		Physical Fitness	General Coordination	Specific Coordination	Control		
Agility	*Shuttle Run	31.602	25.920	26.729	27.270	5.077	.829
Coordination	Throw &Catch	27.374	32.050	30.187	36.446	4.166	.882
Power	Shot Put	198.767	143.970	231.190	161.505	3.871	.704
Flexibility	Flex Test	32.112	[illegible]	27.812	29.750	3.579	.494
Coordination	Volleyball Volley	8.424	13.331	10.404	10.375	2.982	.668
Coordination	Bowling	16.225	12.889	11.340	11.617	2.817	.153
Kinesthesis	*Kinesthesiometer (Direction Differentiated)	19.558	-39.818	16.287	-44.480	3.180	.344

*Low Score Indicates Superior Performance

TABLE 3

COMPARISON OF ADJUSTED MEANS FOR 1970 PROGRAM TEST ITEMS WHERE .05 LEVEL OF SIGNIFICANCE OF DIFFERENCE WAS NOT FOUND

Factor	Test Item	Treatment				F	Reliability
		Physical Fitness	General Coordination	Specific Coordination	Con- trol		
Dynamic Strength	Pull Ups	.732	1.680	1.435	1.258	1.520	.804
Dynamic Strength	Push Ups	.318	.433	..255	.294	.126	.768
Dynamic Strength	Arm Strength	10.959	18.821	19.289	11.314	1.230	.623
Strength	Back Lift	95.229	68.368	62.366	89.204	1.243	.920
Strength	Leg Lift	126.055	89.358	82.327	94.074	1.385	.853
Strength	Left Grip	50.989	44.280	44.361	45.844	1.001	.851
Strength	Right Grip	51.249	44.750	48.629	53.414	1.525	.708
Respiratory Function	Lung Capacity	111.272	111.464	98.611	119.194	1.017	.784
Strength	Strength Index	444.658	372.193	348.503	424.226	1.366	.823
Strength	Physical Fitness Index	51.754	42.842	44.635	49.823	1.005	.854
Muscular Endurance	Leg Lift (Fleishman)	8.620	10.349	11.985	9.381	1.258	.557
Flexibility	Extent Flexibility	14.453	18.390	17.157	19.190	1.142	-.013
Flexibility	Dynamic Flexibility	12.763	13.443	14.261	13.840	.314	-.285
Coordination	Cable Jump (5)	1.855	1.751	2.501	1.554	1.728	.668
Coordination	Cable Jump (10)	2.168	2.300	2.600	1.766	.721	.583
Balance	Balance-A Test	2.206	2.262	2.048	1.996	.162	.388
C-R Endurance	*600 Yard Run	224.744	228.333	213.820	223.224	.329	.904
C-R Endurance	*300 Yard Run	91.472	98.667	80.184	84.111	2.198	.409
Speed	*30 Yard Dash	6.427	7.035	6.609	6.396	1.585	.126
Agility	*Zig Zag Run	8.471	8.141	8.678	7.720	.990	.203
Balance	Tapered Balance Beam	170.460	171.832	169.915	167.911	.066	.862
Muscular Endurance	Squat Jump	13.198	13.431	12.524	12.656	.060	.879
Power	Ball Throw	64.608	61.225	60.887	59.309	1.188	.933
Coordination	Ball Kick	28.713	28.481	25.202	28.710	.697	.587
Power	Shot Put	15.536	15.678	14.945	15.642	.242	.704
Power	Standing Broad Jump	46.487	47.397	49.671	47.811	.756	.955
Flexibility	Flex Test	24.374	24.957	25.117	24.303	.265	.494

Table 3 (Cont'd)

Factor	Test Item	Treatment				F	Reliability
		Physical Fitness	General Coordination	Specifc Coordination	Control		
Coordination	Volleyball Serve	2.751	4.694	2.565	2.337	.949	.911
Kinesthesis	*Kinesthesiometer (Direction Differentiated)	-12.620	26.441	-17.059	.927	.475	.344
Kinesthesis	*Kinesthesiometer (Direction Defferentiated)	141.124	153.039	161.842	146.165	.315	.145
C-R Endurance	Modified Harvard Step Test	68.042	71.416	66.863	72.851	.872	.373

*Low Score Indicates Superior Performance

TABLE 4
COMPARISON OF ADJUSTED MEANS FOR 1971 PROGRAM
TEST ITEMS WHERE .05 LEVEL OF SIGNIFICANCE OF DIFFERENCE WAS NOT FOUND

		Treatment					
Factor	Test Item	Physical Fitness	General Coordination	Specific Coordination	Control	F	Reliability
Dynamic Strength	Pull Ups	.612	1.099	.869	.855	.638	.804
Dynamic Strength	Push Ups	2.907	1.990	3.292	4.228	1.007	.768
Dynamic Strenght	Arm Strength	19.886	23.979	42.954	47.684	2.255	.633
Strength	Back Lift	55.095	46.509	39.595	35.500	.756	.9[illegible]
Strength	Leg Lift	165.085	198.641	229.086	171.355	.657	.853
Strength	Left Grip	36.389	35.769	35.955	38.091	.480	.851
Strength	Right Grip	38.630	37.467	34.200	41.112	.245	.708
Respiratory Function	Lung Capacity	102.575	105.479	119.436	116.209	2.287	.784
Strength	Strength Index	407.463	449.351	495.549	438.940	.531	.823
Strength	Physical Fitness Index	49.579	58.348	56.485	48.250	.876	.854
Muscular Endurance	Leg Lift (Fleishman)	12.462	13.753	13.640	14.833	.942	.557
Flexibility	Extent Flexibility	8.191	8.921	10.634	9.646	.303	-.013
Flexibility	Dynamic Flexibility	14.229	18.878	10.395	14.111	1.368	-.285
Coordination	Cable Jump (5)	1.348	.791	1.172	-.539	1.855	.668
Coordination	Cable Jump (10)	4.277	2.136	3.212	6.016	1.315	.583
Balance	Balance-A Test	2.174	2.495	3.021	2.959	1.103	.388
C-R Endurance	*600 Yard Run	265.817	254.298	300.676	219.797	1.811	.904
C-R Endurance	*300 Yard Run	107.052	124.398	120.140	138.565	.452	.409
Speed	*30 Yard Dash	6.115	5.773	6.401	6.081	1.363	.126
Agility	*Zig Zag Run	8.438	8.114	8.439	8.254	.364	.203
Balance	Tapered Balance Beam	157.140	151.979	139.054	146.286	.534	.862
Muscular Endurance	Flexed Arm Hang	12.156	10.033	13.097	16.100	1.063	.588
Muscular Endurance	Curl Up	19.301	19.642	20.129	28.559	2.264	.616
Muscular Endurance	Squat Jump	16.202	10.741	11.379	12.521	.915	.879
Power	Ball Throw	238.405	246.419	291.701	82.131	2.460	.933
Coordination	Ball Kick	30.361	29.187	32.318	30.174	.324	.587

Table 4 (Cont'd)

Factor	Test Item	Treatment				F	Reliability
		Physical Fitness	General Coordination	Specific Coordination	Control		
Power	Standing Broad Jump	44.579	44.481	46.184	47.809	1.231	.955
Coordination	Volleyball Serve	3.714	3.897	4.063	3.116	.872	.911
Coordination	Badminton Serve	6.193	10.944	6.262	10.290	1.837	.874
Coordination	Basketball Dribble	15.783	16.319	12.602	17.356	.917	.835
Coordination	Handball Serve	1.500	2.525	1.060	2.141	.551	.530
Kinesthesis	*Kinesthesiometer (Direction Undifferentiated)	116.417	119.899	101.967	124.087	.259	.145
C-R Endurance	Modified Harvard Step Test	[illegible]	[illegible]	[illegible]	[illegible]	2.316	.378

*Low Score Indicates Superior Performance

2. The physical education programs may have been of such poor quality that changes did not occur. It was for purposes of allowing a judgement to be made on this aspect that the qualifications of the staff and the effort that went into program planning were described in such detail in the earlier part of this paper. It is the conclusion of the investigator that the programs were at least above average in their implementation. Further it was the opinion of staff members and other professionals associated with the children that important physical performance and emotional adjustment changes did occur. However, the data would usually be interpreted as indicating that the programs did not result in significant changes in physical performance.

3. The test battery may have been too large and repetitious. Many subjects spoke of being bored with taking the tests a second time, i.e. the post test, and despite the efforts of the testers this feeling of boredom may have adversely influenced their performance and negated improvement which had occurred.

4. Emotionally handicapped children may respond to physical education programs differently than "normal" children. It is possible that the factor which limits their performance is of an emotional nature rather than physical. If this were true only a change in emotional adjustment would improve their performance and even if physical education could contribute to their emotional adjustment it is doubtful that these types of changes would be reflected by the end of an eight week period.

The obvious thing to recommend, when the results of a study are as unexpected as these, is that further research be done. That recommendation is made here and it is further suggested that the additional research be planned in consideration of the four points stated above in the Discussion section. It is clear from this study that more research is vital to the area of physical education for emotionally handicapped children and that programs should no longer be assumed to be effective until that research has been done.

DRH/cd

APPENDIX D

Factorial Structure Hypothesized Prior to Data Collection

Factor	Test Item
1. Agility	1. Shuttle Run
	2. Zigzag Run
2. Balance	1. Balance - A Test
	2. Tapered Balance Beam
3. Body Size	1. Height
	2. Weight
4. Circulo-respiratory Endurance	1. Lung Capacity
	2. 600 Yard Run - Walk
	3. 300 Yard Run
	4. Modified Harvard Step Test
5. Coordination	1. Ball Kick
	2. Cable Jump
	3. Modified Cable Jump
	4. Throw and Catch
6. Dynamic Strength	1. Arm Strength
	2. Leg Lift (Fleishman)
	3. Pull-up
	4. Push-up
7. Flexibility	1. Dynamic Flexibility
	2. Extent Flexibility
	3. Flex Test
8. Gross Body Strength	1. Strength Index
	2. Physical Fitness Index
9. Kinesthesis	1. Kinesthesiometer (also with sign)
10. Muscular Endurance	1. Curl-up
	2. Flexed Arm Hang
	3. Squat Jump
11. Power	1. Ball Throw
	2. Shot Put
	3. Standing Broad Jump
12. Skill	*1. Badminton Serve
	*2. Basketball Dribble
	*3. Bowling
	*4. Handball Serve
	5. Volleyball Serve
	6. Volleyball Volley
13. Speed	1. 30 Yard Dash
14. Static Strength	1. Back Lift
	2. Left Grip
	3. Leg Lift
	4. Right Grip

*Test items added for second year of program.

Results of Rotated Factor Matrix Performed On 1970 Test Data.

Factor	Test Item and R to Factor	
1. Upper body strength	1. Throw and Catch	.539
	2. Left Grip	.790
	3. Right grip	.760
	4. Lung Capacity	.744
2. Upper Arm Endurance	1. Flexed Arm Hang	.517
	2. Pull up	.836
	3. Push up	.790
	4. Arm Strength	.852
3. Dynamic Leg Strength	1. Modified Harvard Step Test	.474
	2. Cable Jump (5 forward)	.769
	3. Extent Flexibility	.634
	4. Cable jump (10)	.813
4. Static Back and Leg Extension Strength	1. Back Lift	-.846
	2. Leg Lift	-.864
5. Kinesthesis	1. Kinesthesiometer	-.549
6. Upper Body Coordination	1. Ball Throw	.615
	2. Shot Put	.547
	3. Volleyball Serve	.743
	4. Volleyball Volley	.782
7. Hip Flexion	1. Flex Test	.558
	2. Squat Jump	.693
	3. Leg Lift (Fleishman)	.521
8. Abdominal Coordination	1. Kinesthesiometer	.645
	2. Curl up	.413
9. Leg Speed and Endurance	1. Tapered Balance Beam	.647
	2. 300 Yard Dash	-.569
	3. Standing Broad Jump	.676
	4. 30 Yard Dash	-.719
	5. Dynamic Flexibility	.443
	6. Shuttle Run	-.619
	7. Balance A	.532
	8. 600 Yard Run	-.537
10. Leg Coordination	1. Zigzag Run	.545
	2. Ball Kick	-.734

Only the highest R found for each test item was used to place that test item in a factor.

APPENDIX E

ACTIVITIES USED TO TRAIN TREATMENT GROUPS

IN

THE RESEARCH PROJECT COMPARISON OF
THREE METHODS OF PHYSICAL EDUCATION
PROGRAMMING FOR EMOTIONALLY DISTURBED
CHILDREN

SPONSORED BY

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ACTIVITIES USED WITH THE PHYSICAL FITNESS GROUP

Activities for this group were for physical conditioning development based on the principle of use of exercises to develop each component of the identified factors of physical performance, such as strength, agility, speed, endurance, et cetera. The activities described below were used.

A. Calisthenics

1. sit ups
2. jumping jacks
3. stretching exercises
4. squat thrusts
5. neck circles
6. toe touches
7. hurdle exercise
8. trunk rotation
9. flexibility exercises
10. pull ups
11. push ups
12. crab walk
13. wheel barrow
14. sealwalk
15. isometrics
16. partner exercises
17. chop-chop double arm move
18. mimic leader-in-center moves
19. exercise done in water
20. squat jumps
21. running in place
22. rapid moves from flat feet to toes

B. Games

1. medicine ball soccer
2. fox and squirrels
3. squirrels in trees
4. tag games
5. steal the bacon
6. auto tire tug of war
7. rope jumping
8. kick ball
9. tire throw for distance
10. line medicine ball retrieve
11. tug of war (rope)
12. follow the leader (through playground equipment)
13. timed arm extended side horse rides
14. cage ball merry-go-round push
15. monkey for follow the leader
16. red light: running for those caught

C. Relays

1. returning object relay
2. tire carry relay
3. medicine ball carry
4. tire roll and carry relay
5. ball dribbling relay
6. partner carry relay
7. medicine ball roll through obstacle course
8. tag relay

D. Resistance and miscellaneous activities

1. weight lifting exercises
2. exergmie exercise series

3. medicine ball passing
4. medicine ball toss for distance
5. medicine ball toss for height
6. softball throw for distance
7. canoe paddling
8. horizontal ladder traverse
9. arm hang from horizontal ladder
10. skin the cat
11. stiff arm walk along parallel bars
12. 2 hand grasp rope step through and walk over
13. rope climbing
14. steep slope descent by rope
15. follow leader climb or playground equipment
16. scooter board races
17. bike races
18. basic trampoline bounces
19. standing broad jumps
20. running broad jump
21. trapeze bar exercises from hand grip
22. trapeze bar exercises from knee grip

E. Running Events

1. obstacle course run
2. 10 minute run-walk
3. auto tire agility drill
4. cross country run
5. hike
6. 25 minute run-walk
7. interval training (dash-run)
8. 50 yard dashes

9. 300 yard runs
10. 600 yard runs
11. cross country steeple chase
12. shuttle run
13. one leg sprint
14. long distance running

ACTIVITIES USED WITH THE GENERAL COORDINATION GROUP

Activities for this group were centered around movement concepts, such as balance, impetus to self, impetus to objects, rather than around physical fitness or the learning of specific games. The activities described below were used.

A. Rope Activities - Entire group

Formation

1. Walk on rope - forward, backward, eyes closed
2. Skip, run, hop, jump, etc. around rope
3. Straddle rope - jump $\frac{1}{2}$ twist, straddle rope - jump $\frac{1}{2}$ twist, straddle scis
   Jump forward and across rope going around - repeat for hop.
4. Static Balance - stand on one foot - fold arms - close eyes - draw a circle with your head.
5. Walk around rope, hands and feet, with three parts touching the ground etc.

B. Ball Activities: Two hand striking, throwing, catching underhand and overhand. Used large (10") plastic ball only.

Drills

Circle - instructor (I) in center sets up ball. S has to strike appropriately and return to I.

Line Throw and catch

C. Balance-concept

counter-balance: stand on one foot, lean forward! What happens when your head goes down! Why? Lean sideways! Where does your leg go? Keep same leg up - lean the other way. Is it harder or easier? Why? Discuss principle of see saw.

D. Landing - Trampoline Safety

Trampoline - walk on outer edge of bed. How does it feel? Bounce in middle and stop. Taught stop. Bounce and stop on command.

E. Jump Ropes

1. Jump any way you can.
2. Cast - catch under toes, lift heels and pull around.
3. How high must you jump to clear rope, lay rope on ground and jump, hold in one hand and jump forward and back repeat holding rope in both hands.
4. Hold both ends in one hand and swing around body, overhead, under legs, etc.

F. Two hands overhead throw: impetus to objects

1. Reviewed skill with 10" ball, line drill.
2. In scatter formation skill practiced with variety of implements, several round balls, football, bowling pins, tin can, hockey stick, medicine ball, bicycle tire. Holding medicine ball until last helped keep interest.
3. Application to sports discussed evokes little interest from kids.

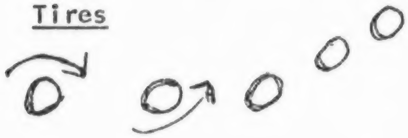
G. Balance

Kirchner - 136, 137, 138, 139, and 140 (Emphasized item 105c), difficult to keep many working. Some try once if at all and quit unless pushed to do more.

H. Impetus to Self: creeping, crawling, rolling, (egg, log, ball, shoulder, etc.) Animal walks - introduce as charades. Good activity, high interest, good ideas.

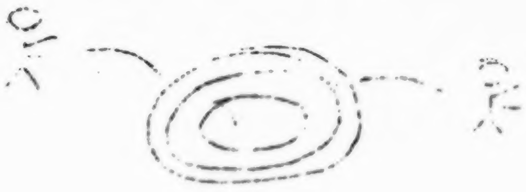
I. Static Balance takeoffs and landings: Impetus to body

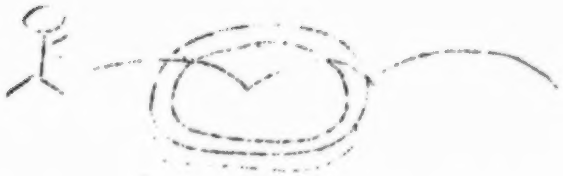
Tires



Run around, jump through, jump over, jump in and out.

Large Tires - jump on - in - out





J. Locomotion

Walk around camp, alternate, locomotion, animal walks, climbing and balancing en route.

K. Balance: Impetus to body.

Mosston - page 145-147 scales finished - note exciting as presented in book.

Kirchner - 256-266

Knee walk, cricket walk

Kangaroo hop, knee jump, see-saw

Dishrag, egg roll, knee hop, turk stand rocker, leap frog, coffee grinder, rowboat, rocking chair, wheel barrow, chinese get-up, shoulder rest; forward and backward roll relays and combatives using skills; good lesson, high interest.

L. Impetus to objects

Two hand, overhand and underhand,

Throw - circles, lines, and moving with assorted objects.

Games - no kick speedball, same as speedball except that ball is moved by passing rather than kicking. Player cannot run with ball. Most (50%) did not comprehend game objective.

M. Balance

Trampoline - jumping with hands in various positions.

N. Impetus to self

Jump Ropes - both feet, jumps, cross ropes, straddle hop backwards, jump the shot.

O. Impetus to objects

No kick speedball with medicine ball and playground ball. Worked well - better concept of game objectives.

P. Balance

Tire steal the bacon - Dynamic balance, pulling the tire against an opponent. They really enjoyed the game. They cheered for each other when they were out pulling the tire.

Q. Impetus to Self

Tire steal the bacon - leaverage was explained to the kids when pulling the tire.

R. Impetus to objects

Tire relays - rolling and carrying tires around other tires.

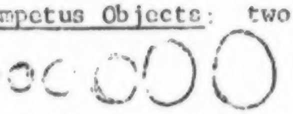
S. Balance (Dynamic)

Balance beam - Forward/Backward swing step - switching sides

T. Impetus - (Body)

Mosstou - Take off, verticle jump. Min and max jump and application. Good lesson.

U. Impetus Objects: two hand, underhand and overhead throw.

6  Tires various sizes

O Throwing circle-throw objects to tire with two hand throw (2 points if it lands inside, 1 point if hits rim.

V. Impetus to objects and body: two hand throws and dodging.

Dodge ball variations guard pin dodge - etc. Games played as elimination led to trouble.

W. Impetus to body: Obstacle Course - Bounce across tires

Hop sidewards across rope.

X. Impetus to Body

Takeoff - landing, landing variations and landing in a new position.

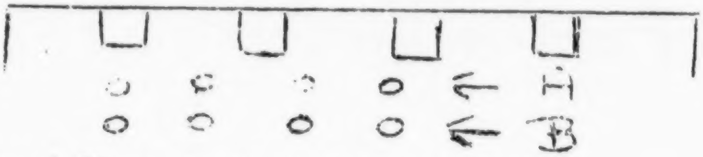
Pool - takeoff from deck, side, board, etc.

Jump, push and glide, dive, etc.

Y. Impetus to objects

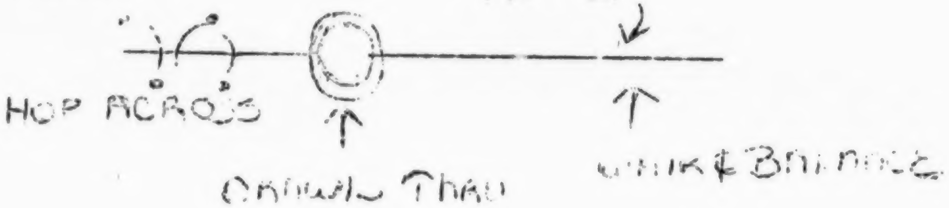
Foul shooting contest, no kick speedball

Z. Impetus to Body: Changing posture in the air-Mosston 39-42.



B tries to throw ball at target, A tries to intercept.

AA. Obstacle Course


ROPE
HOP ACROSS
CRAWL THRU
WALK & BALANCE

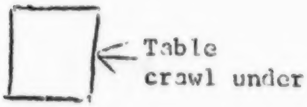
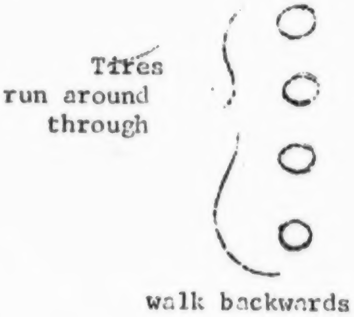
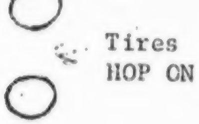
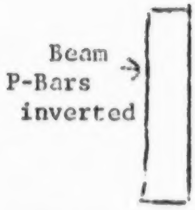


Table
crawl under


Tires
run around
through
walk backwards


Tires
HOP ON


Beam
P-Bars
inverted

AB. Folk Dance Hora and Rhythm Sequence

Circle Dance - side step, cross in back, side step to hop out and kick right to hop right, kick left.

AC. Balance: Mosston - 136-146

AD. Impetus to self· Kirchner - 251-265

AE. Impetus to Object· Overhand and underhand, two handed throwing while moving in circle in parallel movement with partner.

AF. Locomotor Movement: Run, skip, bear walk etc. Around circle on signal find a tire inside the circle.

AG. Tire Activities: Impetus to self; to objects.

Jumping on, over, etc.

Jumping and catching or throwing in air after bouncing off tire.

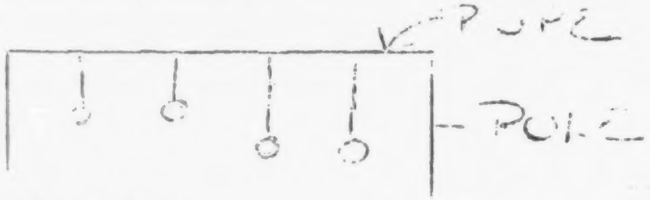
AH. Impetus to Body: Touch and go - combinations.

Obstacle course (p - 43- 47 Mosstou)

AI. Impetus to Objects: overhand and underhand - two hand striking.

Drill 20 mins.

Circle Drill - Plastic ball - keep it up



Teather balls

Elephant Soccer - 40 mins. Hands clasped together to form a trunk, ball can only be struck with a trunk.

AJ. Body Control Balance: Hand-eye coordination.

Field Hockey sticks and wiffleballs. Divided into two teams. Played regular field hockey game.

a. with one ball

b. with two balls

AK. Striking on object:

Played with field hockey stick and varied size balls.

AL. Hand and Eye Coordination: Giving impetus.

Baseball bat, 2 different sized wiffleballs.

1. Subjects.

   First bunted balls-used larger ball, then smaller ones.

2. Kids then took full swing at thrown balls.

   Subjects adjusted well with bunting. Some had difficulty transforming to full swing.

AM. Giving Impetus Recurring Force

Cage Ball - two teams line up at goal line on signal; both run toward ball. Team scores if they can push ball over goal line.

AN. Absorbing Force Giving Impetus

Wiffleballs, medicine balls and utility ball	Throwing these different objects and catching gradually working up to medicine ball.

Went smoothly because of diversity of the size of the equipment used.

AO. Body Control Balance

Trampoline

1. Knee drops 2. Seat drops 3. Lay outs	one individual at time on trampoline
4. Knee drops 5. Seat drops 6. Lay outs	two individuals at a time on trampoline

AP. Hand-eye Coordination

6 balls of different weights and sizes

1. Pair up the kids.
2. Give each pair a certain ball to play catch with.
3. Rotate the balls so that each pair will experience each kind of ball at least twice.
4. Form a circle

   Using 5 balls, have the kid pass ball to next kid on his right, and immediately turn to his left to receive completely different kind of ball. At first confusion and lack of ability in catching balls. But improvement occurred.

AQ. Body Coordination

Balance Hand-eye coordination

4 utility balls of different sizes

Bombardment
Dodge ball — requiring person to be agile and quick. Able to catch and throw ball.

Subjects enjoy this. All participate even in extremely hot weather.

AR. Body Control Balance

Hand-eye Coordination

5 balls - different sizes and weights; inflated, slightly deflated and deflated.

Dodge ball and bombardment.

AS. Catching and Throwing

Used wiffleballs, playground balls, volleyballs, footballs, medicine balls, teather balls; one softball to experiment with different throwing and catching techniques. Very enjoyable to students and worked out really well.

AT. Balance

Walking forwards and backwards on balance beams.

AS. Jumping

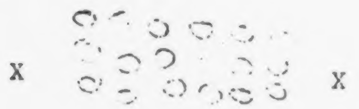
Various hopping and jumping tasks involving rope hand out in form of Maye.

AU. Gen'l Movement: Reaction time

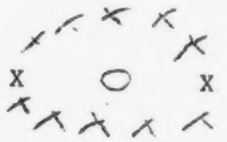
b. Body control

c. Throwing and Catching

1. Played dodge ball, total group in using two enders.



2. Played dodgeball one in circle.



3. Played ducks and geese running game.

Concepts were achieved reasonably well. Weather conditions caused considerable fatigue toward latter moments.

AV. Agility and Balance

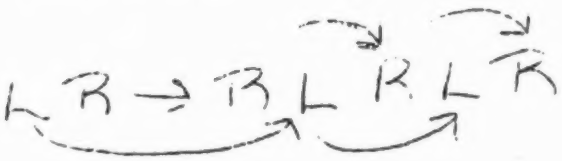
A. Progression

1. Walking forwards
2. Walking backwards
3. Walking sideways
4. Walking sideways facing other direction
5. Running forwards
6. Running backwards (if possible)
7. Running sideways
8. Running sidways facing other direction.

B. Using the 8 methods above, set up relay races making each person do all 8 methods. Later added (9) skipping and (10) hopping on one foot and (11) hopping on both feet.

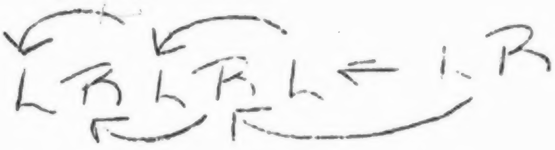
C. When moving sideways taught the crossing of feet that linebackers in foot use.

Moving to right →



1) R to side
2) L cross behind R
3) R to side
4) Repeat

← Moving to left



1) L to side
2) R cross behind L
3) L to side
4) Repeat

Took awhile but most caught on.

AX. Agility and Balance

A. Progression

1. Walking and stepping into set of tires
2. Running through set of tires
3. Walking across balance beam over water
4. Running across balance beam over water
5. Walking certain route set off by two lines of branches (stay between branches laid out on ground)
6. Running certain route set off by two lines of branches.

B. Walking on a single rope and each hand had a separate rope to help maintain balance.

At first, group was afraid. But later all wanted more chances at trying to do it.

AY. Balance and Coordination (Hand-eye)

Spoons and whiffle balls (relatively small)

Progression

1. Walk certain distance holding spoon in hand while keeping ball balanced on the spoon.
2. Walk certain distance with spoon in mouth.
3. Walk balance beam (wider one) with spoon in hand.

4. Walk wider balance beam with spoon in mouth.
5. Walk narrow balance beam with spoon in hand.
6. Walk narrow balance beam with spoon in hand.
7. Walk wide balance beam while balancing clipboard on head.
8. Walk narrow balance beam with clipboard on head.
9. Walk wide balance beam holding clipboard with both hands and balancing to keep whiffleball on clipboard.
10. Repeat #9 except on narrow balance beam.
11. Repeat #9 on wide balance beam, one hand holding clipboard.
12. Repeat #11 except on narrow balance beam.

Worked fairly well; was a challenge each time because kept getting harder.

AZ. Body Control and Coordination, to balance, agility and flexibility

Tumbling mats

Taught and performed following skills:

1. Pencil roll (and Pen roll)
2. Forward roll
3. Backward roll
4. Knee-elbow headstand
5. Knee-elbow handstand
6. Headstand
7. Handstand

Starting with skill and trouble in performing except for more capable subjects.

BA. Hand-eye Coordination

One miniature toy bowling ball. Ten toy bowling pins.

Individual play

1. First person to knock down 21 pins wins. Everyone equal number of turns. Team play, first team to knock down 50 pins wins. Enjoyed by subjects, though some had trouble releasing the ball properly.

BB. Balance and Agility Coordination (Body)

Trampoline

1. Knee drop
2. Seat drop
3. Layout
4. Hand-knee drop

Work on drops separately. Then try to make up a routine.

Always like to work on trampoline; easy to control and handle subjects at trampoline.

BC. Impetus to Body Touch and Go

Touch and Go - Mosstou (pp. 42-46) 20 minutes.

BD. Impetus to Objects

Two hand striking underhand and overhand line and circle drills.

BE. Impetus to Body

Cookout, hike, activities enroute, climbing, locomotor, etc.

BF. Balance

Beam - Bucks County Program Routines, section 3.

SECTION 3

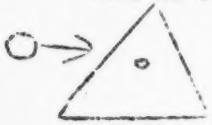
BALANCE

OUTCOMES

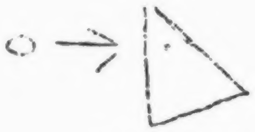
1. Static and dynamic balance
2. Visual steering
3. Sequencing
4. Body image, laterality, directionality
5. Language and number concepts through verbal feedback
6. Visualization and motor planning
7. Posture

PRINCIPLES OF BALANCE TRAINING

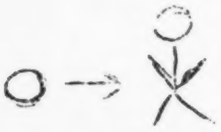
1. Stability (balance) is maintained by keeping the center of gravity (the point around which the weight of a body is evenly distributed) within the base of support.

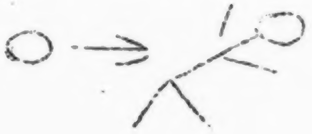


Stability



No Stability





C = Center of gravity

2. For a child to regain lost balance, he must be able to adjust his posture smoothly so that the center of gravity is maintained within the base of support. He does this by either widening the base of support (such as, spreading the feet) by counter-balancing (such as, raising a leg when leaning forward).

3. In order to develop or improve balance, the child must be placed in situations where stability is disturbed (thrown off balance) so that

3 continued

he must make the necessary postural adjustments.

4. Balance appears to be an ability which is specific to the task rather than a general ability. Therefore, it is necessary to use a variety of tasks to train the child.

5. Balance tasks are either static, where the body is held stationary in one position (such as standing on one foot), or dynamic (where balance is maintained while the total body is moved through space as in walking a balance beam).

6. As the child approaches mastery of a task, the task should be varied or more complex. This practice makes performance on the simple task more automatic, while at the same time making the child more motorically adaptable.

   An example of this would be:

   a) Walk beam forward heel-toe

   b) Do "a with a swing step."

   c) Do "a and b" and verbalize "Right foot, left foot."

   d) Do a, b and c, and bounce a ball.

   e) Do a, b, c and d and hold a flashlight beam on a wall target.

ACTIVITIES

Walking Board (balance beam)

1. Walking forward, backward, sidewards, eyes open and closed, any kind of step.

2. Heel-toe walking - heel of front foot is always placed against the toe of the back foot.

3. Swing step - left knee bends and right foot is swung in a gentle arc forward to about knee height and placed in heel-toe alignment with left foot. Repeat for left foot.

4. Forward and back - rear foot swings gently backward then forward and is placed in front in heel-toe alignment.

5. Sidewards - rear foot is raised as far and as high to the side as possible and placed in front position in heel-toe alignment.
6. Walk to middle of beam, perform a stunt (turn around, pick up object, front scale, etc.; see (stunts) below), walk to end of beam.
7. Walk beam balancing objects such as a broomstick on the fingertips, a beanbag on the head, a tower of blocks, etc.
8. Walk beam stepping over and ducking under broomsticks.
9. Walk beam and carry a heavy object on one side. This technique is useful for the child who leans only to one side to balance. The object should be carried on the side to which he does not lean.
10. Attach a bucket to either end of a pole. Alternately drop weights into or remove them from the bucket as the child walks the beam. This technique is helpful to the child who maintains a rigid posture and, thereby, avoids having to make a postural adjustment to maintain posture.
11. Watch a wall target while walking the beam.
    a) A geometric shape or letter
    b) A light that blinks on and off. If the light can be controlled by the teacher the child can respond "on-off".
    c) Have the child carry a flashlight and aim the beam at a target. This may be more effective if the room is darkened and the target will reflect the light (such as, a small mirror or a "cats eye".) The child responds "On the target - Off the target".
    d) Watch own shadow projected on a wall.
12. Have objects swinging from a string at right angles to the beam. Child must dodge, duck or time his movements so that he is not struck as he walks the beam.
13. Bounce a ball or play catch while walking the beam.

STUNTS

"CAN YOU......

1. " stand on your toes"

2. " Stay on your toes and put your hands in the air, both to one side, both in front, both in back."

3. " Stay on toes and bend, backward, forward, sideward"

4. " Repeat #2 and #3 in squat position"

5. " Stand on four parts of your body"

6. " Stand on hands and feet"

7. " Lift one hand"

8. " Lift one leg"

9. " Lift one leg and one hand"

10. " Lift both hands and one leg"

11. " Stand on one foot - lift your leg and head as high as you can - put your hands up like an airplane" (Front scale)

12. " Vary #11 with hands and feet in various positions (hands behind neck, out to one side)

13. " Sit down Indian style

    - put your hands up like an airplane"
    - tip your wings" (lean to right and left)
    - now dive" (lean forward)
    - now climb" (lean backward)
    - now stand up with arms and legs folded"

14. " Sit down legs out straight"

    - lean back as far as you can
    - raise your feet off the floor
    - put your arms over your head
    - spread your legs

15. " Jump in the air and land on your tiptoes"

16. " Jump in the air, turn around and land on your tiptoes" (do quarter, half, and full turns)

17. " Jump in the air and land on one foot"

18. " Jump in the air, turn around and land on one foot"

19. " Jump in the air and touch your knees (toes, head, clap, etc)

20. " Partner Stunts, - Wheelbarrow, Chinese Get Up,

21. " Combatives - Chicken fight, tug-of-war.

OTHER ACTIVITIES USING EQUIPMENT

1. Balance Board, Bongo Board, Balla Rolla, Hip Swing, Etc.

2. Balance Blocks - Blocks cut from 2" x 4" studs approximately 8" to 10" in lengths.

   a) Used as "stepping stones"

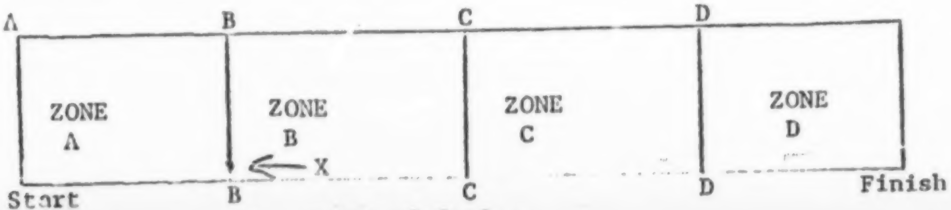
   b) Each child is given three blocks and asked to cross an area without touching the floor. This task requires the child to plan a placement of the blocks, so that he is able to step from one to the other (motor planning), and to maintain balance during a variety of postural adjustments as he moves the block that is in back of him to a position in front of him.

   c) Each child is given two blocks and asked to cross an area without touching the floor as in "b". This task is more difficult since it requires the child to balance on one leg while recovering and placing the available block.

   d) Each child is given two blocks and asked to cross an area without touching the floor - or lifting the block. The children will "skate" across the floor. This has been found to be effective in teaching sliding.

   e) Races using any of the above. If the child steps off the blocks he fouls.

Fouls are penalized by having the child return to a starting line or zone line as indicated below.



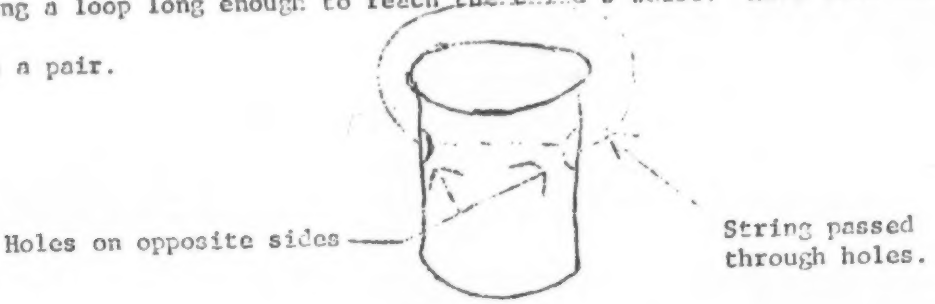
X - Point of foul -

If the foul is committed in zone B, the player must return to the beginning of that zone or line B.

f) Play floor hockey using blocks as "skates"

g) Have the child stand with a block under each foot. He then lifts one foot and places a second block on top of the first. Then add a second block to the other side. Continue in this manner until the child is standing on two stacks of three or four blocks.

3. TIN CAN STILTS - Puncture a hole in the sides of a tin can near the top and pass a string through the hole. Tie the ends of the string together making a loop long enough to reach the child's waist. Have each child make a pair.



Have the children take a "Moon Walk" on the stilts.

4. Trampoline, tumbling, gymnastics.

5. Skating and skiing.

6. Skateboard and gym scooter activities.

7. Stilts and pogo stick.

8. Riding a bicycle or scooter.

9. Walking heel-toe on various configurations of a rope (figure eight, letter e, etc).

10. Jumping from heights (tables, chairs, walls, etc) and maintaining balance or falling properly upon landing (receiving impetus).

11. Any activity in which an overhead projector or spotlight can be used to project the subjects shadow upon the wall in such a way that he can watch his movements as he performs.

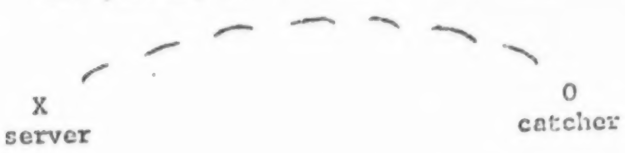
ACTIVITIES USED WITH THE SPECIFIC SKILL GROUP

I. Badminton skill practice drills began with a paddle which the subject used to hit a bird to his partner and culminated in official games of badminton using rackets, birds, and a net. Lead up activities, drills, and games as described below were used as training experiences.

A. Introduction to rackets, bird, underhand service (just hitting it).

1. Implementation

use paddle, shake hands, swing underhand, hit the bird.



Who can serve the farthest? Who can serve the highest? Repeat sequence using racket rather than paddle.

2. Evaluation

Lesson held interest. Majority of group need much practice.

Paddles worked well. Rackets were difficult to use.

B. Underhand swing (serve and volley), direction control, hitting to a target, underhand volley.

1. Implementation

Use old tires as target, who can serve his bird into the tire? Use shuffleboard markings for game of scoring services. Who can keep his bird in the air?

2. Evaluation

Basic underhand stroke still needs work. Class interest is held.

Repeat these skills.

C. Volley (continuous) Game situation.

1. Implementation

Racquet and Birds - team situation paired up and volleyed for as long as possible. Went over rules and strategy.

2. Evaluation

Majority of subjects interested for most of the time. Very interested in games until they got behind. Kept good attitudes for 40 minutes.

D. Single Games strategy - rules

1. Implementation

Racquet and birds - team situation

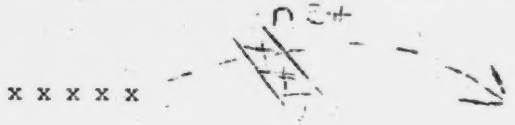
2. Evaluation

Played rotation in singles. Much more interest than doubles. Still more interested in causing friction among team mates.

E. Underhand stroke - serve, volley

1. Implementation

Using net, have class serve over it.



squad formation

Throw bird over net, have class return over net

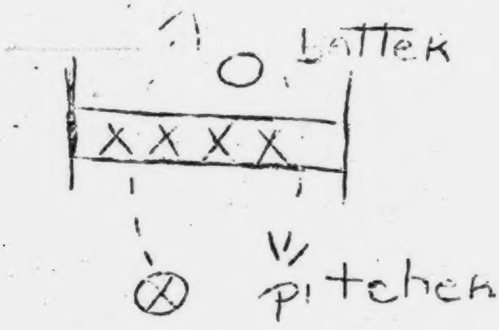
Can you keep the bird in the air? Can you serve to your partner

2. Evaluation

Some of the group can handle rackets, others still need paddle.

F. Badminton Baseball

Pitcher serves over net to the batter. Batter volleys the bird back over the net.



G. Volley over net using underhand stroke and serve.

1. Implementation with partner how many times? Can you make it go over the net?

2. Evaluation

Group is beginning to gap. Some are ready for game situation. Part of group cannot sustain a volley.

H. Review of group - underhand serve and return

1. Implementation

Racquets - Instructed them. They held racquet. Lined up and served over imaginary net. Implemented serve and return. Had them in competitive situation.

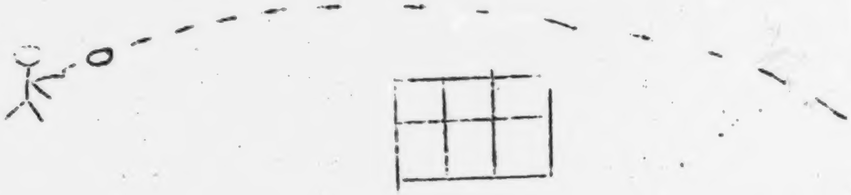
2. Evaluation

Some of them had difficulty at first but they caught on. Some could hit the bird but not straight. Others could not hit it at all. Rather chaotic, but some of them had volleys of 2 or 3.

I. Grip and Service stance (legal serve)

1. Implementation

Racquet and bird (8 each)..........imaginery service line that the participants must stand behind.........goal was to hit (serve) bird above and beyond the cage at end of field.



2. Evaluation

Worked well after about 5 minutes of effort but by that time they were getting discouraged.

J. Volley

1. Implementation

Groups of two........serving and returning to each other from a distance of 20 feet.

2. Evaluation

Only one case of obvious inaccuracy. I worked with Tom as an individual.

K. Single file volley drill

1. Implementation

Threw birdies of each pupil as quickly as possible to have them get the feel of a quick return..........

2. Evaluation

Most returned 50%....... One returned 70 %....... One returned 30%.

L. Develop legal below waist badminton serve...............

1. Implementation

Badminton racquet and bird (7 of each) demonstration....followed by group correction of serve.....individual attempts in groups of twos.

2. Evaluation

Established reports with the group.....group is ready to start game rules and regulations.

M. Returns.............(power play)

1. Implementation

Same as L above.........groups of two to return bird to each other after a legal serve.

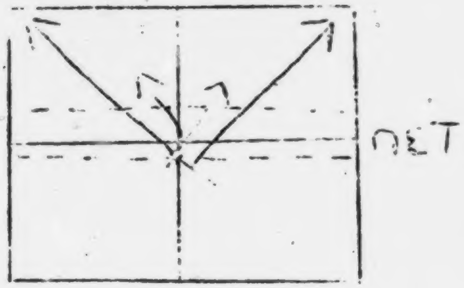
2. Evaluation

worked well....

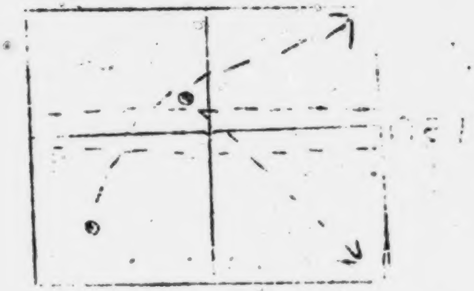
N. Rules, regulations and strategy

1. Implementation

Talked about serving, boundries, courtesy toss for rights of side or to serve.



Serve



Drop & quick
clears

Worked well with the group, had two of the Rat Patrol in the group since quite a few were testing.........the game between Ed. and Ed. shows the possibility of true champions at the game.............

2. Evaluation

Worked well. They have good control over the flight of the birdies. They are taking wind into consideration while hitting the bird.

O. Concept of scores and rules

1. Implementation

One point per missed volley. Serve and return:

2. Evaluation

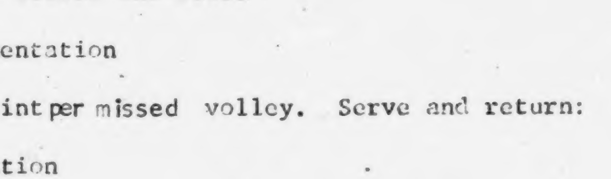
Very difficult concept. Must review concept of points and object of game.

P. Fake out opponent, execute the deep clear (overhand and underhand). Learn stategy for use of the clear and drop shot, use these skills in game (singles).

1. Implementation

Racquets and birds.

Court



Deep Clears - Drop shots

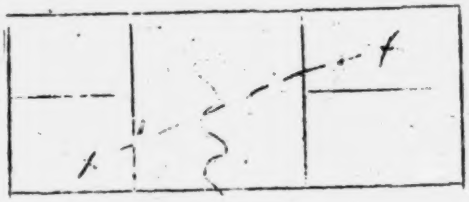
2. Evaluation

Used outside courts-boys could not adjust to wind. Went into arena and had single elimination. Games were good and boys started getting interested as games became closer.

Q. Strategy - using it in competition

1. Implementation

Racquet - bird - nets



Fake - drop shot - hair pin shot

Peers keeping score and telling of mistakes.

2. Evaluation

Used elimination. Seemed to go well once the games were close. Probably try it again next time.

R. More strategy in game situation. Rules for problem situation. Stress fair play in all cases.

1. Implementation

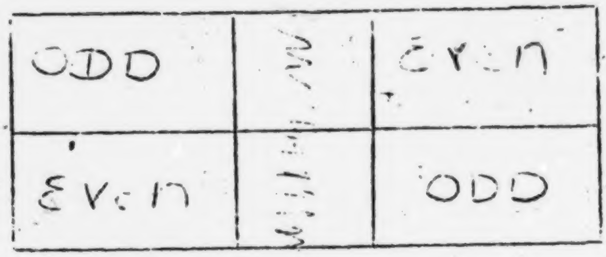
Use arena for the singles games. Start using team play for the doubles.

2. Evaluation

The games went better, attitude was better but they are a little annoyed at the time spent on Badminton.

S. Smash - overhand-went over scoring situations more rules brought into play.

1. Implementation



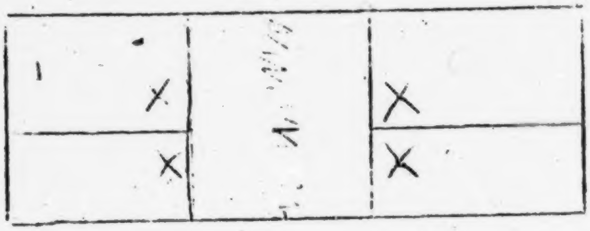
- Went into the proper serve for the situation (singles or doubles)

2. Evaluation

The singles went very well, Interest is building in all of the boys.

T. Doubles - stress team work in doubles. Boys seem very independent. Want to avoid as many arguments as possible.

1. Implementation



Want people to get along and work together as team members.

2. Evaluation

The first 2 games were good. Not one argument. Then once the same person lost twice, trouble started. Need to set team up so people won't lose as often.

II. Basketball skill development drills began with a utility ball and a basket on a table and culminated in a modified game using five men per team and seven and one half foot high baskets with an official basketball. Lead up activities, drills, and games as described below were used as training experiences.

A. Catching and passing concept: two handed chest pass and two handed underhand pass.

1. Implementation

Physical Education for Elementary School children. By Glenn Kirshner Catching - pages 413-414 Fig. 441-442,443 and 444. Passing - pages 414-416 Fig. 445,446,449,450.

Drills

(a) circle passing 422

(b) zig zag passing 422

(c) shuttle passing 422 (walking)

(d) four corners passing 423

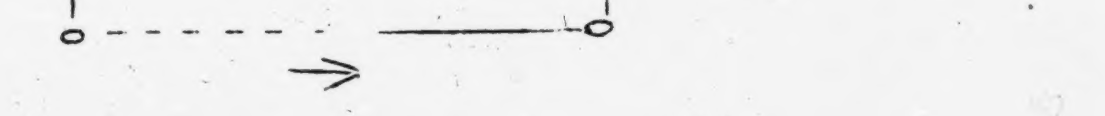
(e) passing against the wall from about 8ft. to practice passing and also catching technique.

2. Evaluation

All of the drills went very well except one boy had trouble understanding the four corners drill.

B. Dribbling skill concept

1. Implementation



Each boy stood at one corner of a square with one corner having two boys. One of these boys started the drill. Dribble half way then pass the ball to the boy at the next point of the square. He then goes onto the next boy while the first boy takes over his corner.

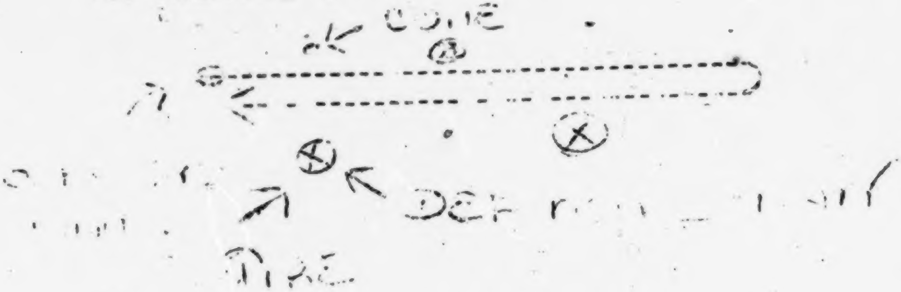
Games of three on three and five on five half court were played.

2. Evaluation

This drill, containing dribbling and passing skills, worked very well.

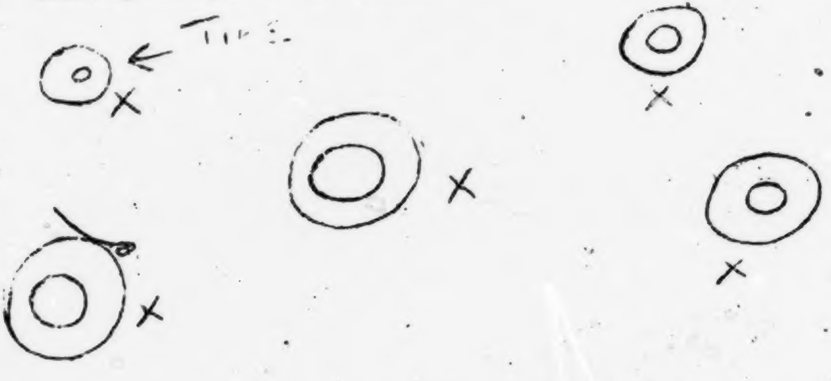
During the game some boys showed good skill and knowledge while others seemed to forget what was taught.

C. Dribbling against Defense



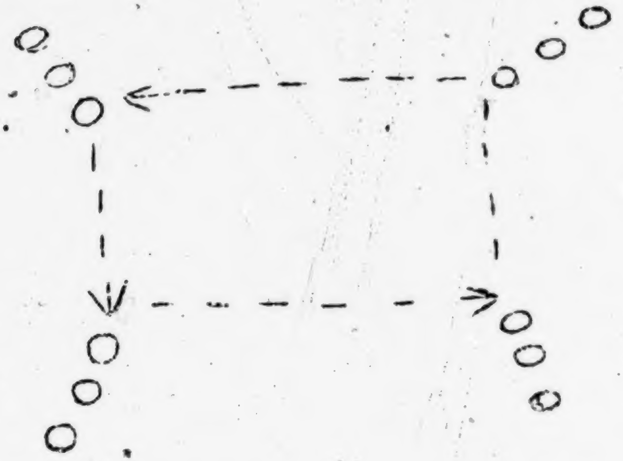
Offensive man must dribble through each gate turning his body so ball cannot be stolen by defensive. Defensive man must keep both feet in tire.

D. Passing and pivoting against defense



Tires in scatter formation one offensive man in each tire. Offensive man must keep one foot inside tire while trying to keep ball away from defense by passing.

E. Dribble and Pass



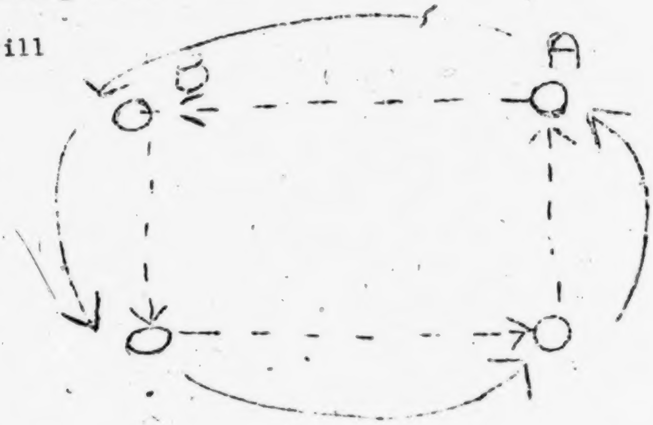
Dribble to next line and pass back to original line.

F. Game Application

Nine court basketball - Kirchner, P. 432.

G. Passing Weave

Drill



A passes to B and runs to position behind B, B passes to "C" etc. 20 mins.

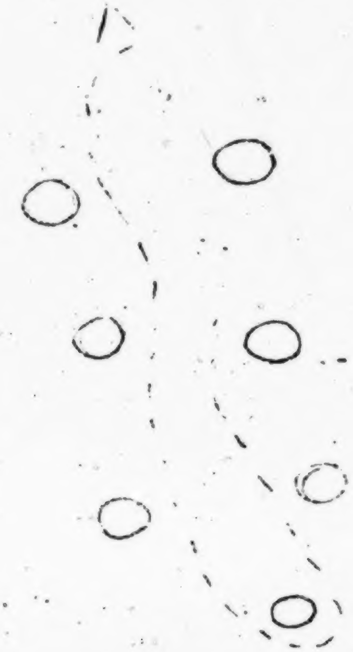
H. Catching Pivoting

Butterfingers

Group in scatter formation instructor passes ball to each one in random order trying to "fake out" players. When one person drops ball he must "chunk the butter" (run around the tire with one foot in center - pivot) until another misses and takes his place. 20 mins.

I. Dribbling - Defense

1. Implementation



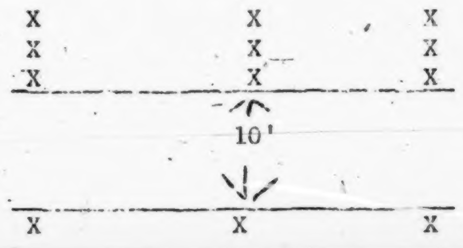
Tires placed as per diagram. Player dribbles through gates and around cove and back through gates. Run the gauntlet - Defensive player stands with both feet inside tires and tries to steal the ball from the dribbler.

2. Evaluation

Good activity, high interest among more able kids, can be modified for younger kids.

J. Passing and Catching

Motor skills: Passing and catching a basketball. Formation: File formation with leaders facing files ten feet away.



Description: The leader chest passes to the first player in his squad. That player bounces to the leader and then runs to the leader's position. The leader gives him the ball and goes to the end of the file. Repeat the process until each player has had a turn to be the leader.

Variation: Can have leader pass to the first person, who then dribbles to leader's position and pivots to face his squad. The first leader runs to the end of the file.

K. Lay up skills

L. Shadow drill

(a) involved offensive and defensive player

```
X          X
X          X

O          O
```

M. Dribble relays

N. Chest pass relays

O. Chest pass manuevering drill (two man)

P. Games: Utilizing three main components of dribbling, passing, and shooting

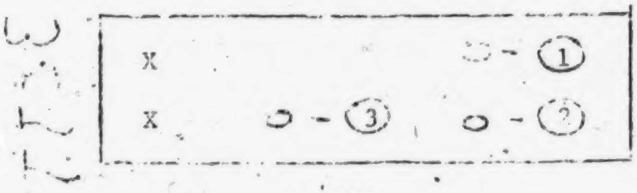
III. A handball skill development sequence was used which began with a suspended 5 inch utility ball and progressed to use of a large official handball a legal game of handball. Lead up activities, drills and games, as described below, were used as training experiences.

A. Striking a ball (hand-eye coordination)

1. Implementation

(a) The kids had to catch with scoop handles made from plastic bottles. The underhand throw was used to give the kids the action of the underhand serve and volley used in handball.

(b) Five stations-



X - Two children with small utility balls practicing serve and volley up against the wall.
O - Three balls hanging from the ceiling by string. The kids could practice striking the ball without it bouncing far away from them. The balls were hung at different heights to enable the kids to strike the ball in different positions.

- 1 overhand
- 2 underhand
- 3 mid way between. Balls were also hung from the X position in the beginning of the hour.

2. Evaluation

The hanging balls were very worthwhile for the group just to get the coordination of striking a moving ball. Instructor tapped the ball back and forth with the child. This seemed to create a game atmosphere and also get the children to use both hands.

B. Hand position and serve stroke

1. Implementation

Drop handball and on bounce stroke to gymnasium wall.

2. Evaluation

Enjoyed very much and wanted to practice the serve using the position which was taught.

C. Body position

1. Implementation

Shift of body weight from rear leg to front leg to get power into stroke.

2. Evaluation

Extremely difficult for children because of their lack of agility but it took some time to develop. Movement to the ball was difficult but did improve.

D. Eye-hand coordination

Various drills were used to implement this skill, such as hitting against the ball and returning their own serves.

E. Use of Serve

The serve went very well--much progress showed in a matter of days.

F. Use of hands with the "rules" being implemented.

Worked very well, however, for the lower groups it was a little difficult to switch body position and opposite hand usage.

G. Drills, serving drills, switching hands drills, wiffle ball drill.

1. Implementation

Wiffle ball attached to string hanging-- repetition stressed.

2. Evaluation

Improvement shown. Needed time to develop. Worked very well, giving them a chance to improve their skill level.

H. Games, modified handball, 9 square handball

1. Implementation

Blocked - out areas, hit against walls on each end, used scoring system.

2. Evaluation

Worked well with higher groups.

IV. Touch football skill development drills began with throwing and catching a small football and culminated in games of touch football with six players per team. Lead up activities, drills, and games as described below were used as training experiences.

A. Throw and Catch

Small football used. Stood in straight line, threw ball to them and they throw back.

B. Throw and Catch

1. Implementation

Throw football longer distance than previously. Had them run short patterns.

2. Evaluation

Had trouble getting them to run after ball.

C. Catching, Hiking, and Passing

1. Implementation

Catching Drills

a. running straight out

b. running to left

c. running to right

d. hike ball than run as in a, b, and c.

Passing drills (and catching)

Formation kids
xxxxxxxxxxxx

O instructor

2. Evaluation

Subjects enjoyed movement for pass catching

D. Throwing Accuracy

1. Implementation

Had boys throw ball through the tire.

2. Evaluation

One third to one half of the subjects could accomplish this task successfully.

E. Throw and Catch

Lines go out, catch pass and throw back.

F. Punt

1. Implementation

Went through the motion first, then introduced the ball and how it is to be punted.

2. Evaluation

Some had the coordination and others had little or none.

G. Game Play

1. Implementation

Game rules were talked about and put into use in a game.

2. Evaluation

The game was too organized for some boys.

H. Running with ball

Subjects shown how to hold ball and run at same time.

I. Blocking

Demonstrated and worked in groups of 3 subjects with one blocking, one carrying the ball and the third attempting to tag the ball carrier. Positions rotated when the tag was successful.

J. Catching

1. Catching Drills

a. straight put

b. down and out

c. down and in

d. in post

e. buttonhook

2. Passing Drills

Same drills as above but take turns passing and catching.

3. Hiking drills

Same as above but also add turn at hiking

K. Football Fundamentals

Practice throwing football.

"Catching Technique"

-get in line with coming ball

-place feet in forward stride position one foot forward

-keep eyes on ball

-extend arms toward thrower and spread fingers

-cup hands, thumbs together slightly above waist (high throw):

keep little fingers together with hands below waist for low throws.

-let arms and body give as ball contacts hands.

-carrying ball

L. Game play and strategy.

-Drilled in basics

-practiced "catching kicked ball"

-It was really much more difficult to catch kicked ball; subjects still have some fear even with Pee-wee ball when it is high in air.

M. Football Skills

"Catching and Throwing"

"Catching while running"

"Centering the ball"

"Punting and place kicking"

Throwing and catching is getting better. They are also understanding the jobs assigned to different positions, such as the center and quarterback.

Punting and place kicking was very poor.

N. Catching, passing, hiking and punting

1. Implementation

Learning of certain pass patterns, buttonhook, down and out (left and right), and post.

Drills, arm position with ball on left side, arm position with ball on right side, and mix up which side to receive ball on.

2. Evaluation

Difficult for them to remember what to do without additional practice.

O. Game Play

Throwing and catching drills

- carrying ball
- centering ball
- introduced "blocking" techniques

P. Blocking

1. Implementation

One - on - one blocking

a. proper stance

b. leg movement

c. walk through

d. ½ speed

e. 3/4 speed

2. Evaluation

Most enjoyed contact and want more

Q. Touch-Football Game

Improving on who to block. More work needed.

R. Backfield Positions and Responsibilities

Told Positions

1. fullback

2. quarterback

3. halfback

Then position placement of where they are suppose to be when lined up.

Told responsibilities

1. When running, follow blocker if going through line.
2. When blocking for runner.
3. When quarterbacking, how to hand off ball
4. To receive ball from center.
5. When running, how to place arms and hands to receive handoff from quarterback.

At first lots of confusion as to what to do except for really capable subjects.

S. Backfield positions and responsibilities review

1. Implementation

   Same as before

   1. 1/4 speed
   2. ½ speed — running positions from hiking to quarterback
   3. 3/4 speed
   4. full speed

2. Evaluation

   Fast learners eager to learn more and discouraged at slow learners.

T. Contest of things taught; within each group.

1. Implementation

   Pass, Punt, and kick contest

   a. Winner of pass
   b. Winner of punting
   c. Winner of kicking
   d. Overall winner by distance.

2. Evaluation

   Some thought that they had no chance to win.

U. Game of touch football

Six players used per team, additional practice could result in more complicated plays and better skill.

V. Volleyball skill practice drills began with utility balls hanging from a beam for striking practice and culminated in games using a seven and one half foot net and an official volleyball. Lead up activities, drills, and games as described below were used as training experiences.

A. Balloon Volleyball

1. Implementation

7 players per team - stressed 3 hits per side and rotation.

2. Evaluation

Very well received, all participated and appeared to have understanding of volleyball.

B. Catching Volleyball

1. Implementation

Utility Ball - 2 lines on either side of instructor-throw ball to each child. (1 at a time then in quick succession)

2. Evaluation

Some of the boys were afraid of ball; hand ball to such boys in order to keep interest.

C. Volleying, hot potato game

1. Implementation

Utility ball - boys stand in circle and batted ball around-could not catch the ball (had to volley)

Wall Volley - # of successive volleys against a wall.

2. Evaluation

Hot potato circle went well because of the game aspect of the treatment.

D. Bounce serve

1. Implementation

Four square game AAHPER Games Book P. 323

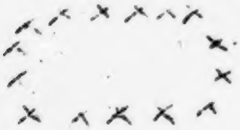
2. Evaluation

Very well received

E. Underhand serve

1. Implementation

Hitting in groups



2. Evaluation

Utility balls used were extremely light - hindered older boys performance - ready for official volleyball.

F. Fingertip Control

1. Implementation

Inflated volleyball

Drills for hand control

a. using parallel line formation

1. play catch using two hands to catch ball in any way.
2. instruct hand position for setting up volleyball.
3. using set hand position catch ball
4. immediately throw ball with control to other person after catching.

b. using circle formation. Repeat procedure from above.

2. Evaluation

Tired of this quickly most of period used to explain rules.

G. Fingertip Control

1. Implementation

Repeat drills used previously but speed them up. Also gave rewards for good performance and push-ups for mistakes. Made a contest out of drills.

2. Evaluation

Received better than as given in F above

H. Underhand Serve

1. Implementation

Start serving ball to person opposite you in other line. (Formation parallel lines)

Then worked on serving across the net a short distance from net. Gradually increased distance from net.

2. Evaluation

Frustation started to set in as increased distance from net to correct distance.

I. Volleying ball

1. Implementation

Volley ball off of wall:

a. long as possible without mistake

b. most number of volleys in set amount of time.

2. Evaluation

Kids liked this type of challenge, because can achieve some success.

J. Underhand Serve

1. Implementation

a. Underhand serve. Drills (Progression)

1. opposite lines - top ball to person opposite you.

2. standing back certain distance serve ball up and into roof of building.

3. Repeat #2 and add a set pass when ball comes off of roof.

4. Repeat #2 and add attempts at volleying ball of of wall.

b. Using formation diagrammed

kids
xxxxxxxxxxx

O
instructor

have kids serve ball to instructor quickly, then instructor serves ball to next kids. If bad serve by kid, have do 5 pushups that must be done before his turn comes up again, or do 5 more pushups.

Makes rest of kids work more quickly. More like a game, contest.

K. Volleyball Game

1. Implementation

Divided group into six teams and each team played.

2. Evaluation

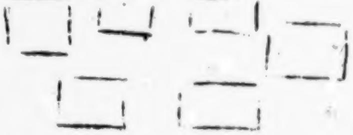
Each team won one game. Interest in volleyball seems to be very minute. Only about 4-5 boys seemed to want to play at all.

VI. Wrestling skill practice drills began with demonstrations of the various stances and moves, and culminated in regulation wrestling bouts. Lead up activities, drills, and games as described below were used as training experiences.

A. Use fundamental approach to the wrestling. Short introduction. The indian, leg and college styles.

1. Implementation

Placed mats in circle and tee formations. Put boys of same age against each other.



2. Evaluation

It was well received. The boys were matched and seemed to enjoy themselves.

B. Upright referee's position - wrestling, down referee's position, spinning, escaping, controlling.

1. Implementation

Which boy can push or pull other boy off the mat. One man down other man spring on chest. Group was divided into two groups Two mats laid together were used.

2. Evaluation

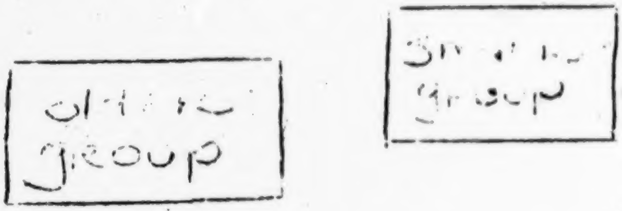
This activity as very stimulating. Strict control is necessary. Boys seem interested. Skill progression will need careful planning.

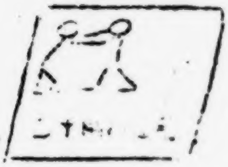
C. Wrestling stance, referee's position, escapes, take downs, flat hold:

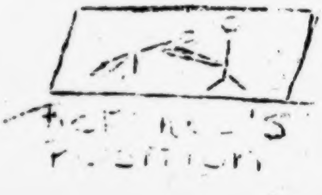
1. Implementation

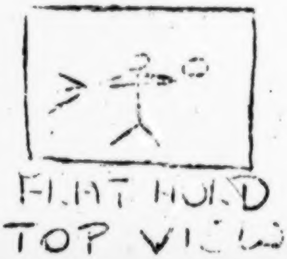
Mats

Two groups







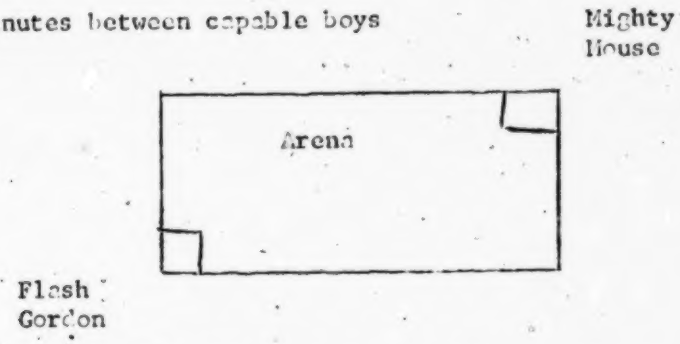


2. Evaluation

Much more unified than the other day; some trouble with the roll (older fellows) younger fellows worked on escapes and take downs.

D. Wrestling Match

Last 3 minutes between capable boys



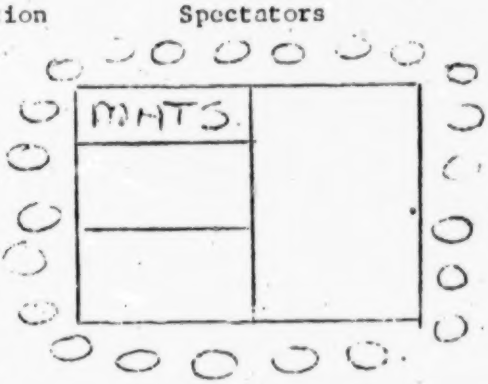
Each boy had his own team backers and his own corner.

E. Leg Drags, cross leg counter, review of rolls, stance, counters, and escapes.

Used - 1 on 1 method with demonstrations.

F. 2 min. Matches - 2 new boys on 2 who have wrestled in class previously.

1. Implementation



2. Evaluation

Fellows are putting together most of the moves but some times out of excitement they tussle instead of wrestle.

G. Demonstration and practice of:

1. Wrestling stance
2. Referees position
3. Take downs
4. Escapes
5. General review of previous lessons

6. Learned controlling hold

H. Leg take down - cradle - stance with arm fakes

1. Implementation

1 on 1 combative after demonstration, slow then fast

2. Evaluation

Group was a little restless but eventually settled down to business.

I. Escape skills from bottom position

1. Implementation

Have the kids use the take down from standing position. Use the off position to get control of players.

2. Evaluation

The drills went O.K. Subjects looked forward to the real matches.

J. Introduce ½ nelson from referee's position emphasize leverage for turning opponent onto his back.

K. Regular match

1. Implementation

Using all mats, instructors acting as referee, time player, score keeper, each boy competed in a 2 min. match.

Proper procedure being emphasized.

2. Evaluation

Good lesson, boys controlled themselves. No emotional outbursts!

This unit was a surprise success.

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2. Mosston, M., Developmental Movement. Columbus: Charles E. Merritt Books, Inc., 1965.
3. Perceptual Motor Programs. Doylestown, Pennsylvania· Bucks County Public Schools.

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SECTION II

METHOD AND RESULTS

General Statement

The overall intent of this project was envisioned as being two-fold. Primarily the concentration of effort was directed toward establishing a comprehensive data bank composed of physical, perceptual, cognitive, affective, behavioral, academic, and social correlates of physical performance for emotionally-disturbed, male, public school children. Secondly, a comparison of three types of physical training was planned to determine the differential effects of training for three types of emotionally-disturbed children.

To these ends Section II of this report is composed of results of various statistical analyses. Within this section additional subdivisions are made to provide clarity and continuity to the presentation of the findings.

The evaluation component of the present investigation was designed to include purely descriptive data as well as rigorous statistical treatment of the criteria of interest. Information from a broad array of standardized measures as well as tests unique to this investigation was gathered to ascertain any effects of the physical training treatments under study in the physical performance as well as in the intellectual, behavioral, and educational achievement domains. The test battery included measures in four areas. These areas (listed alphabetically) are:

1. achievement in school
2. behavior
3. learning aptitude
4. physical performance

Data presentation for the descriptive part of this section is appended in Tables 1 to 91. Common descriptive statistics for each diagnostic group by treatment and (in some cases) time of testing are provided. Correlational data is also provided for certain variables.

The experimental design for this study included three major factors:

1. Diagnostic category
2. Training method
3. Time of testing

Because of the nature of the experimental design and the number of observations made using various measures, two approaches to the analyses were taken. Where only two observations were made using the same measure (pre-post) an analysis of covariance-type of design was employed. In those cases where three observations were taken a repeated measurements-type of analysis was used.

A preliminary investigation of the pre-test data provided evidence that treatment group differences approached statistical significance. A multivariate F-ratio of 1.368 for 21 selected criteria ($p < .06$) indicated the possibility of statistically significant differences in treatment/diagnostic group means for some criteria taken singly. Covariance analysis is a statistical means of controlling for such initial differences among groups on the criteria of interest and for this reason was used as one of the statistical techniques.

Selection of Subjects

The pool of children from which the experimental subjects in this study were drawn consisted of all males enrolled in special classes for emotionally disturbed children in Montgomery County (Pennsylvania) Schools during the Spring of 1970. The subject pool was restricted in three ways.

It was required that those subjects invited to participate in the program be between 8 and 14 years of age, that they be free of any serious physical defects, and that they be available to participate in the eight-week summer physical education program.

From an initial pool of approximately 130 boys enrolled in special classes, 95 subjects were selected for the program. This sample consisted of subjects classified as being in one of three general psychiatric diagnostic categories. These categories were labeled "Aggressive," "Hyperactive," and "Withdrawn." Assignment of subjects to one of the four treatment conditions was made on a stratified random basis. The 32 subjects within each diagnostic category were randomly assigned to the three treatment and one control groups.

Because of absenteeism during the training period several subjects were deleted from the final sample. Several other subjects were not available for the post-testing. Thus, the number of subjects included in any analyses will vary depending upon time of testing, availability for testing, and whether or not the subject was "testable" during the testing program.

No follow-up of those subjects who were deleted from the initial sample has been made. It is assumed, however, that no particular bias was acting that would jeopardize the utility of these findings.

This report is written in a final manuscript format due to the great number of tables and figures presented. The narrative is concerned with discussion of statistical analyses of data appropriate to each of four subdivisions in which testing was accomplished. These four areas are:

1. Achievement
2. Behavior
3. Learning Aptitude
4. Physical Performance

Appendix A contains all tables and figures derived from analysis of variance and covariance procedures referred to in the narrative. Appendix A also contains all tables and figures presenting data that is descriptive in nature.

PART 2

STATISTICAL ANALYSES

(Summary tables appropriate to the following discussion of analyses can be found in Appendix A of this report)

Achievement in School

Two common measures of elementary school achievement were used to assess any effects that the training regimen may have had on these criteria. The tests used were the Stanford Achievement Test (SAT) and the Wide Range Achievement Test (WRAT). Each test was administered on three separate occasions. The experimental design included a repeated measurements factor which is one means of helping to control for initial differences on the criterion.

From the SAT grade equivalent scores were derived for three subtests: Word Meaning, Paragraph Meaning, and Arithmetic Computation. As can be seen in Table 1 no significant main effect for the treatment factor (Factor B) appeared with SAT-Word Meaning as the dependent measure, although the Treatment by Diagnostic Category interaction approached statistical significance.

The analysis of variance does yield significant effects for the repeated measurements factor as a main effect and in combination with the other design factors. By looking at the treatment means for each test administration (See Table 2) the practical significance of the AB interaction can be gauged. A plot of these means appears in Figure 1 for the SAT-Word Meaning sub-test scores.

No great practical significance is attached to the repeated measurements effect. Because the criterion is in a grade equivalent score metric and the testing is distributed over nearly 10 months the mean scores are normally expected to increase.

Two significant effects were found for the SAT-Paragraph Meaning scores. Of particular interest is the BC interaction found in Table 3. An interaction of this nature might reveal a possible "aptitude-treatment" type of interaction which would indicate that one particular treatment is best for one diagnostic group while another treatment might be more appropriate for a different diagnostic category. Study of the treatment means by diagnostic groups would help to uncover any such effect (See Table 4).

As can be seen from Table 5 no significant main effects (except A) were found for SAT-Arithmetic Computation.

Two subtest scores were derived from the Wide Range Achievement Test (WRAT): a Reading score and an Arithmetic score. For the WRAT-Reading subtest (see Table 6) significant main and interaction effects were found for nearly all factors. The mean grade scores for the B_1 and B_4 treatment groups (shown in Table 7) on the WRAT-Reading variable were higher at the outset and remained higher throughout.

For the WRAT-Arithmetic subtest score the significant effects involved the A and C design factors. In Table 8 the AC interaction effect, as revealed by the diagnostic group by time of testing cell means, indicates that the "hyperactive" group had a slight reduction in Arithmetic scores as measured during the second testing.

In sum, the physical education treatments as a whole appeared to have very little if any effect on school achievement as measured by the SAT and the WRAT. Simple effects analyses might reveal some hidden differences although this type of expost facto analyses does not appear warranted.

Behavior

In an effort to assess the effects of the physical training program on subsequent behavior in the classroom two behavior rating scales were used. The Devereaux Elementary School Behavior Rating Scale (DEV) yields eleven factor scores said to summarize various ratings of classroom behavior. Quay's Behavior Problem Checklist yields several aspects of behavior in the classroom setting as well as general observations about children's social and personal behavior.

The analyses for these measures took two forms. For the Checklist an analysis of covariance design was used. For the DEV repeated measurements analyses were calculated for each of the factor scores. The results from the DEV are described below.

Analysis of the first DEV factor score (Table 9) revealed several significant effects. The significant overall B or treatment effect indicates that at least one mean treatment score, disregarding diagnostic class and time of testing, is significantly different from another. A look at these means (Table 10) reveals the B4 (Control) group mean to be lower than the B_1-B_3 means. Disregarding all other design factors, the B4 or Control group generally were lower rated on Classroom Disturbance items than other treatment groups.

The analysis of variance revealed no statistical significance for any effect for DEV-Impatience (see Table 11). One explanation for the lack of any significant differences for DEV-Impatience is that this factor may be measuring only random effects or measuring impatience but not reliably.

For the DEV-Disrespect/Defiance factor (Table 12) two significant effects were obtained. The main effects for Diagnostic Group and for Treatment were found to be statistically significant. A survey of the means (Table 13) revealed that the T_4 group mean is low compared to the others. Further, the C_3 group means in all treatment conditions were found to be lower than the other diagnostic groups.

Table 14 shows that for the DEV-External Blame factor no statistically significant effect was found.

The AC interaction for DEV-Achievement Anxiety (Table 15) is the only statistically significant effect for this criterion variable. In Figure 2 a plot of Diagnostic Group means for the three testings provides a graphical representation of this interaction. The means reveal a reduction in measured achievement anxiety immediately following the treatment period (Post 1). The means for the second posttest as a group approximate the pretest means.

Again, for DEV-External Reliance the AC interaction was found to be statistically significant (see Table 16).

A plot of the Diagnostic Group means (Figure 3) for each testing provides one method of observing this interaction. The C_1 group (Aggressive) encountered a reduction in mean measured External Reliance whereas for the C_2 group (Hyperactive) there was an increase in mean measured External Reliance.

In Table 17 it is shown that for the DEV-Comprehension factor only the main effect for Diagnostic Group was found to be statistically significant. Table 15 further shows that the mean factor score for C_2 (Hyperactive) was higher than the other two groups.

For the DEV-Inattentive/Withdrawn factor (Table 19) the main effect for Diagnostic Group was found to be significant. The mean factor score for C_3 (Withdrawn) was higher than the other two Diagnostic Groups (See Table 20).

In Table 21 is found a significant A effect, the repeated measurement, for DEV-Irrelevant-Responsiveness which is indicative of a statistically significant reduction in mean factor scores across the repeated testing.

For DEV-Creative-Initiative a significant effect was found (as shown in Table 22) for the C effect (Diagnostic Group). The mean factor scores (Table 23) for the three Diagnostic Groups show the C_3 (Withdrawn) group to have a much lower mean factor score than the other two groups.

The analysis of variance for the cirterion DEV-Need Closeness to Teacher resulted in three effects being statistically significant with summary statistics shown in Table 24. The effect of treatment (B) cannot be interpreted directly because of the significant BC interaction. A plot of the BC cell means in Figure 4 revealed that the B_3 treatment group had a generally lower mean factor score although the B_4 group was generally lower also.

From Quay's Behavior Problem Checklist four factor scores are derived. The analysis of covariance for the Conduct factor score (Table 25) revealed only a significant regression effect. No other effect approached statistically significance.

For the Personality factor score two effects were found to be statistically significant. Of prime concern is the significant treatment effect found in Table 26. Treatment group B_1 appeared to result in lower Personality factor scores than the other treatment groups (see Figure 5).

The analysis of covariance for the factor score of Immaturity (Table 27) resulted in a treatment (B) effect that nearly approached statistical significance. A plot of the adjusted treatment means for the three diagnostic groups in Figure 6 revealed the B_1 treatment group to have lower adjusted treatment means than the other groups.

Table 28 shows analysis of the fourth factor score, Socialized Delinquency, resulted in statistically significant effects for regression and for the A effect (diagnostic category). The adjusted diagnostic group means for the C_3 group (Withdrawn) were found to be lower than for the other two diagnostic groups.

The Draw-a-Person test was another measure administered to each subject on two occasions. The analysis of covariance technique was applied to the two separate scaled scores that result from this measure. The analysis of the scaled score for the male figure (Table 29) resulted in a significant regression effect plus a treatment by diagnostic group (A x B) interaction. A plot of the adjusted cell means for this effect appears below in Figure 7.

Again for the DAP-Female Figure (scaled score) the regression effect and the A x B interaction effect were statistically significant (see Table 30). The adjusted treatment means for this interaction appears in Figure 8.

Physical Performance

A comprehensive series of physical performance test items were included in the test battery.* Of the 38 variables for which data are available four of these variables are considered index measures. These are combinations of several of the actual performance test and/or physical measurement items per se.

Physical performance test items were selected for inclusion in the battery because of the presumed relationship each had with one or more of the treatment conditions. Furthermore, the 38 variable battery was designed to tap each of 12 physical performance "factors." The "factor" names and the test item names that measure some aspect of the factor are:

Factor Name	Test Item Name
Agility	Shuttle Run Zig Zag Run
Balance	Balance A Test Tapered Balance Beam
Circulo-respiratory Endurance	Lung Capacity 600-yard Run-Walk 300-yard Dash Modified Harvard Step Test
Coordination	Ball Kick Cable Jump (5) Cable Jump (10) Throw and Catch

*(This is a list of performance variables and therefore excludes body size variables, i.e. height and weight.)

Dynamic Strength	Arm Strength Leg Lift Pull-ups Push-ups
Flexibility	Dynamic Flexibility Extent Flexibility Flexibility Test
Kinesthesis	Kinesthesiometer Kinesthesiometer (sign included)
Muscular Endurance	Curl-up Flexed Arm Hang Squat Jump
Power	Ball Throw Shot Put Standing Broad Jump
Skill	Volley Ball Serve Volley Ball Volley
Speed	30-yard Dash
Static Strength	Back Lift Left Grip Leg Lift Right Grip

The statistical technique employed to assess the treatment effects was the analysis of covariance. In each analysis the covariate was the pretest on the measure. Presentation of the analyses follows the order of the factors previously noted. Accompanying each analysis summary table are the product-moment correlations of chronological age with the pre- and posttest scores. Statistical significance of any effect is noted in each table only if commonly accepted levels are approached or exceeded. It should also be noted that the summary for a test of the equality of regression coefficients in each cell appears at the bottom of each Summary Table.

Two test items were employed to measure Agility. Table 31 reveals that only the regression effect is significant for the Zig Zag Run. It also shows a significant effect for a test of the equality of regression coefficients. The latter indicates that at least one regression coefficient is significantly different from one other. Had any main or interaction effect approached significance extreme caution would have been taken in the interpretation thereof.

The second measure of Agility was the Shuttle Run Test. Table 32 shows that both the treatment effect and the Diagnostic Group effect were found to be statistically significant. By plotting the cell means these significant main effects can be more readily interpreted. Figure 9 reveals both main effects. For example, looking at the columns, the mean scores for the "A" group (aggressives) are generally lower than for the others. Likewise the "W" group (withdrawn) means tend to cluster higher than those for the "H" group (hyperactive). By looking at the lines on the graph, the treatment effects are apparent. In general, treatment 1 (physical training) and treatment 4 (Control) are lower than for, say treatment 2 (General Coordination). In other words, treatment 1 results in adjusted posttest scores being somewhat lower than for the other treatment conditions.

For the Balance factor two test items were administered. For the Balance A Test (Table 33) the Diagnostic Group (hereafter it will be called Factor A; Treatment will be called Factor B) effect approached significance ($P < .07$). No other effect was found to be significant. It is interesting to note the lact of statistical significance for Regression. This result is indicative of a lack of correlation (or regression) between the pretest and posttest scores on this test.

A significant AB interaction was obtained for the Tapered Balance Beam Test (Table 34) item. A plot of the adjusted treatment means (Figure 10) indicated that the General Coordination treatment (T2) was better for the aggressive and hyperactive groups whereas the physical training treatment was more profitable for the withdrawn group with regard to this test item.

Four test items were included in the test battery to measure the factor entitled Circulo-Respiratory Endurance. The analyses revealed no significant main effects or interactions. None of the treatments had an appreciable effect on the measured variables, however, summary tables 35 through 38 are included for continuity.

The Coordination factor was measured by four test items. The Ball Kick item did not measure effects attributable to the treatment conditions nor was there a significant regression of post or pretest scores.

The two Cable Jump Test items both had AB interactions that approached statistical significance (see Tables 39 and 40). There were also significant regression effects.

As shown in Table 41, the treatment effect approached statistical significance for the test item entitled Throw and Catch. A closer look at the adjusted treatment means in Figure 11 revealed that, in general, the three physical training groups performed better than the Controls on this measure.

Dynamic Strength as a physical performance factor was measured by four test items. In only one case was a significant main effect obtained. Summary statistics appear in Tables 42 through 45.

Three measures of flexibility were included in the physical performance test battery. The analysis of covariance (Table 46) with Dynamic Flexibility as the criterion yielded a significant A effect.

Statistics presented in Table 47 reveal that the analysis for the test item, Extent Flexibility, resulted in a significant AB interaction. Low Extent Flexibility scores resulted from treatments 1 and 2 for the "Withdrawn" group but high scores for the "Aggressive" and "Hyperactive" groups. On the other hand treatment 1 resulted in low Extent Flexibility scores for the "Aggressives" and "Hyperactives" and higher scores for the "Withdrawns". (see Figure 12).

The analysis of covariance for the Flex Test scores (Table 48) resulted in only the regression effect being significant.

Two measures on the Kinesthesis dimension were obtained. The analyses resulted in no significant effects as shown in Tables 49 and 50.

Muscular Endurance as a physical performance factor was measured by three test items. Analysis of the scores for the Curl-up Test (Table 57) resulted in a significant effect for treatment. Scores on the Curl-up Test are considerably higher for the "Controls" (T_4) than for actual physical education treatments, especially treatment 1 (General Coordination)(see Figure 13).

For the Flexed Arm Hang measure (Table 52) significant effects were obtained for both main effects. The graph of the adjusted treatment means in Figure 14 depicts both main effects. For example, treatment 1 seems to have substantially lower criterion means than the other treatments. For the diagnostic group effect, the "Withdrawn" group has generally lower treatment means than the other two groups.

No significant effects were found for the test item entitled Squat Jump (Refer to Table 53).

The factor entitled Power was assessed by means of three test items. The findings for each of the measures were the same. No design factor was found to be statistically significant. In each case the regression effect was found to be significant, however, as can be noted in Tables 54, 55 and 56.

Skill as a physical performance factor, was measured by two test items. One measure, Volley Ball Serve, yielded a significant regression effect only (see Table 57). For the Volley Ball Volley measure (Table 58) all design factors were found to be statistically significant. However, because of the significant AB interaction the individual main effects cannot be interpreted directly. By plotting the adjusted treatment means the actual effects can be interpreted more readily. The graphical display in Figure 15 reveals the effects of treatment as well as those for diagnostic group. It appears that treatment 3 as a whole resulted in higher criterion scores than, say, the control condition. Also, the "Aggressives" appear to have higher mean Volley Ball Volley scores than the other two groups.

A significant A effect shown in Table 59 was found for the one Speed factor item, the 30-yard Dash. The treatment means indicate the "Aggressive" group to have lower criterion scores, in general, than the other two diagnostic groups. The within-cell regression were found to be significantly heterogeneous. This result tends to make the interpretation of any findings difficult. One assumption of analysis of covariance is that the within-cell regression coefficients be homogeneous. If this assumption is not met, any interpretation of other effects is tenuous.

The last factor, Static Strength, was measured by four test items presented in Tables 60 through 63. None of the analyses resulted in a statistically significant design effect.

Four index measures were also calculated to summarize, in part, some of the measures taken on each participant. In three of the four cases the assumption of homogeneity of within-cell regression coefficients was not met. No design factor produced statistical significance. Summaries of analyses for the four index measures may be found in Tables 64, 65, 66 and 67.

Learning Aptitude

Three measures of learning aptitude in common use with children are the Wechsler Intelligence Scale for Children (WISC), the Illinois Test of Psycholinguistic Abilities (ITPA), and the Bender-Gestalt Test for Young Children (B-G).

Ten subtests of the WISC were administered to each subject both before and immediately following the summer treatment. In only two of the ten analyses were any statistically significant design effects obtained. For the three IQ scores obtained from the WISC only the Performance IQ yielded a significant design effect.

Thirteen analysis of covariance summary tables (68-80) are presented for the ten WISC subtests and the three IQ scores.

The ITPA subtests provide another means of assessing various types of learning aptitudes. This test is particularly applicable to measuring encoding and decoding skills. The ITPA focuses on these skills as they apply to psycholinguistic abilities although certain motoric abilities are measured. Inclusion of this diagnostic measure was to ascertain any changes in measured psycholinguistic abilities that might have arisen due to the training program. No direct relationship was sought. However, any changes in these measured abilities might be indirectly related to the treatment.

The analyses of covariance for the ITPA subtests resulted in five subtests having significant A (Diagnostic group) main effects and one subtest yielded significant AB interaction. The summary tables for these analyses are below.

Table 81 shows that no significant effects were found for ITPA - Auditory Reception.

For ITPA - Visual Reception a significant A effect was found (see Table 82). The adjusted cell means showed the "withdrawn" group to be lower, in general than their counterparts in the other treatment groups.

Analysis of ITPA - Auditory Association subtest scores (Table 83) also resulted in a significant A effect. The "withdrawn" group again had adjusted treatment means lower than the other groups.

For ITPA - Visual Association (Table 84) a significant AB interaction resulted. A plot of the adjusted treatment means (Figure 16) depicts the effects of each of the treatments.

From Table 25 it is evident that no significant effects were found for the analysis of the ITPA - Verbal Expression scores. For ITPA - Manual Expression (Table 86) there was a significant effect for Diagnostic Group. However, for the Manual Expression scores the test for homogeneity of regression coefficients was significant, making the result difficult to interpret.

For the Visual Closure (Table 87) scores, a significant effect for A was found. The subtest, Grammatical Closure (Table 88) did not yield any significant effects.

No significant effects for Auditory Memory were found. For Visual Memory there was a significant A effect. However, the analyses for Visual Memory also resulted in a significant test for homogeneity of regression coefficients (see Tables 89 and 90).

The Bender-Gestalt Test for Young Children was administered to the participants three times. The repeated measurements analysis resulted in a significant repeated measurements effect. Since the criterion in this analysis was error scores the result seen in Table 91 is not surprising. The effect of maturation (nearly 9 months) could produce this result.

Discussion

In light of the above analyses it would be possible to highlight and statistically exploit various significant main and interaction effects, but to do so would serve only to mislead the reader. Superficially, it would seem that a great many significant results are reported herein and, ordinarily, a recurrent effect such as Diagnostic Group by Test Time interaction would stimulate further investigation. However, when one considers the plethora of variables, factors and indexes measured, the number of significant results does not exceed that attributable to chance. Also it was stated that the three treatment groups were all based on physical activities differing only in what factors were emphasized. Given the extensive amount of physical activity prescribed for these groups it would be within reason to expect numerous significant differences in posttest scores on physical variables. Yet this is precisely the area in which one finds a dearth of statistically significant results.

The experimenter's first reaction would be to suspect that a sufficient number of differences do exist in the data but the analyses used were unable to reflect these differences and were perhaps not appropriate to the design. In order to examine this possibility further, let us begin with the unit of comparison. The group raw score mean, as used in this experiment, is the best estimate of the true mean and, therefore, regression of individual scores to the group mean is not necessary. In a portion of their article on measurement of change Cronbach and Furby (1970) address themselves to this question with the statement "The difference in sample means for X and Y [obtained by applying the same operation to the subject on two occasions] is the best available estimate of the mean D [true difference]."

If we can have confidence in the unit of comparison then is it possible to find fault with the statistical technique employed? When one is measuring gains as a consequence of treatments, randomization of treatment and control groups becomes a critical determinant of analysis design. Cronbach and Furby (1970) recommend that in the randomized experiment, analysis of covariance is an adventageous technique so long as r_{xy} is relatively large ($r_{xy} < 0.4$) This technique formed the basis of our analysis with covariate pretest scores adjusting for initial differences between groups. Thus it is doubtful that more accurate information would have resulted from use of a technique such as "residualized gains". Since the design we were dealing with called for randomized groups, it would appear that the proper analyses were carried out. However, as noted earlier in this report, preliminary investigation of pretest data provided evidence that treatment groups differences approached significance despite employment of accepted randomization procedures. In light of these differences we were obliged to consider different forms of analyses. After careful consideration of alternatives, however, we must agree with Lord's (1967) statement that, "there simply is no logical or statistical procedure that can be counted on to make proper allowances for uncontrolled preexisting differences between groups [p.305]."

Conclusion

Since it is apparently impossible to statistically remove confounding effects of initial differences it was decided to forego further attempts to determine treatment differences. Realizing that all of the asumptions of the original model were not met, we are presently reanalyzing the data. Our purpose is to examine pre-post differences for each treatment taken individually. Preliminary results for selected physical variables support the expectation of significant improvement following treatment.

APPENDIX F

Table 1.

Three-factor Analysis of Variance
with One Repeated Measure
Criterion =

SAT - Word Meaning

SOURCE	*df*	*MS*	*F*	*P<*
Between	80			
C (Diagnosis)	2	12.8	2.08	
B (Treatment)	3	12.0	1.94	
BC	6	13.1	2.13	.06
error (between)	69	6.1		
Within	162			
A (Pre-Post1-Post2)	2	9.0	44.64	.001
AC	4	0.2	0.79	
AB	6	0.6	2.82	.02
ABC	12	0.6	3.05	.001
error (within)	138	0.2		

Note. - Repeated measurements were taken before (Pre) immediately after (Post1) and approximately eight months after treatment (Post2).

Note. - Correlation of age with
pre = 0.57 p .
post1 - 0.47 p .
post2 = 0.47 p .
(d.f. = 79)

Table 2.

Treatment Group Means by Diagnostic Category and Time of Testing - Criterion Variable = SAT - Word Meaning

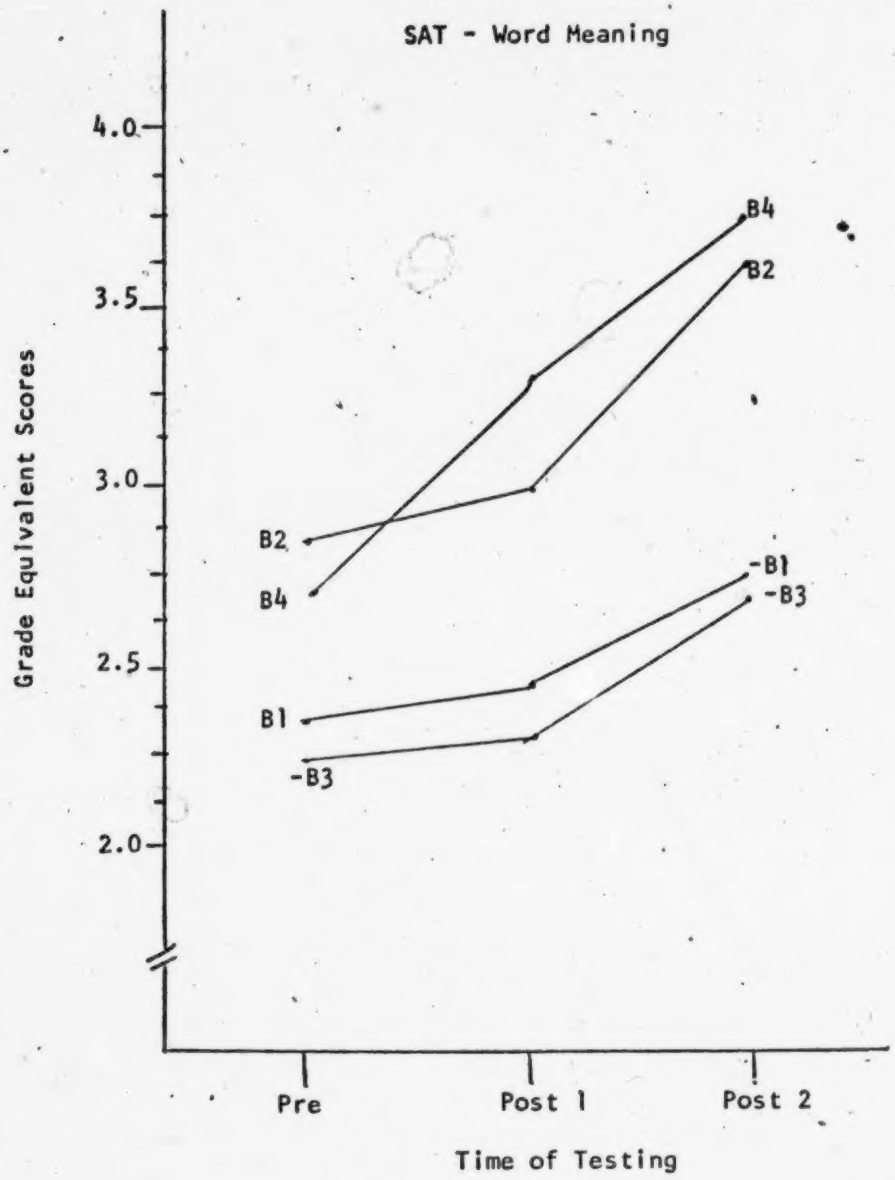
Diagnostic Category		Treatment Group 1	2	3	4
A	Pre	2.08	2.17	2.20	2.10
	Post 1	2.17	2.31	2.32	2.28
	Post 2	2.55	2.86	2.91	2.78
H	Pre	3.07	3.24	1.95	2.47
	Post 1	3.42	3.64	1.97	2.73
	Post 2	3.62	4.72	2.28	3.08
W	Pre	1.92	3.10	2.75	3.62
	Post 1	1.82	3.25	2.67	5.07
	Post 2	2.05	3.40	2.92	5.47

Figure 1.

Treatment Means Plotted
by time of testing

on the Variable

SAT - Word Meaning



A

Table 3.

Three-factor Analysis of Variance with One Repeated Measure Criterion =

SAT - Paragraph Meaning

SOURCE	*df*	*MS*	*F*	*P<*
Between	80			
C (Diagnosis)	2	11.4	2.30	
B (Treatment)	3	8.9	1.80	
BC	6	11.4	2.30	.05
error (between)	69	5.0		
Within	162			
A (Pre-Post1-Post2)	2	8.0	26.34	.001
AC	4	0.4	1.45	
AB	6	0.3	1.13	
ABC	12	0.3	1.04	
error (within)				

Note. - Repeated measurements were taken before (Pre) immediately after (Post1) and approximately eight months after treatment (Post2).

Note. - Correlation of age with
pre = 0.44 p .
post1 - 0.42 p .
post2 = 0.45 p .
(d.f. =79)

Table 4.

Treatment Group Means by Diagnostic Category
and Time of Testing - Criterion Variable =
SAT - Paragraph Meaning

Diagnostic Category		Treatment Group 1	2	3	4
	Pre	1.98	1.95	2.06	2.27
A	Post 1	2.08	2.05	2.02	2.10
	Post 2	2.40	2.72	2.77	2.73
	Pre	2.75	2.94	1.97	2.10
H	Post 1	2.58	3.13	1.76	2.12
	Post 2	3.30	3.95	2.08	2.50
	Pre	1.73	2.67	2.53	3.68
W	Post 1	1.88	2.93	2.58	4.88
	Post 2	1.93	3.42	2.88	5.07

Table 5.

Three-factor Analysis of Variance
with One Repeated Measure
Criterion =

SAT - Arithmetic Computation

SOURCE	df	MS	F	P<
Between	80			
C (Diagnosis)	2	4.0	1.01	
B (Treatment)	3	3.2	<1	
BC	6	7.2	1.85	
error (between)	69	3.9		
Within	162			
A (Pre-Post1-Post2)	2	6.5	31.08	.001
AC	4	0.3	1.33	
AB	6	0.2	1.15	
ABC	12	0.2	<1	
error (within)	138	0.2		

Note. - Repeated measurements were taken before (Pre) immediately after (Post1) and approximately eight months after treatment (Post2).

Note. - Correlation of age with
pre = 0.43 *p* .
post1 - 0.40 *p* .
post2 = 0.38 *p* .
(d.f. = 79 *)*

Table 6.

Three-factor Analysis of Variance
with One Repeated Measure
Criterion =

WRAT - Reading

SOURCE	*df*	*MS*	*F*	*P<*
Between	80			
C (Diagnosis)	2	103.9	5.98	.004
B (Treatment)	3	54.7	3.15	.03
BC	6	37.7	2.17	.06
error (between)	69	17.4		
Within	162			
A (Pre-Post1-Post2)	2	13.1	13.10	.001
AC	4	0.3	1.15	
AB	6	0.6	2.22	.05
ABC	12	0.4	1.45	
error (within)	138	0.3		

Note. - Repeated measurements were taken before (Pre) immediately after (Post1) and approximately eight months after treatment (Post2).

Note. - Correlation of age with
pre = 0.47 p .
post1 - 0.46 p .
post2 = 0.49 p .
(d.f. = 79)

Table 7.

Treatment Group Means by Diagnostic Category and Time of Testing - Criterion Variable = WRAT - Reading

Diagnostic Category		Treatment Group			
		1	2	3	4
A	Pre	2.57	2.93	2.63	2.70
	Post 1	2.52	3.00	2.76	2.72
	Post 2	2.98	3.60	3.32	3.33
H	Pre	4.20	4.38	2.28	3.15
	Post 1	4.17	4.87	2.66	3.37
	Post 2	4.93	5.58	3.10	3.37
W	Pre	2.73	5.40	3.45	7.25
	Post 1	2.45	6.31	3.32	7.82
	Post 2	2.97	7.03	3.92	8.67

Table 8

Three-factor Analysis of Variance
with One Repeated Measure
Criterion =

WRAT - Arithmetic

SOURCE	df	MS	F	P<
Between	80			
C (Diagnosis)	2	0.2	0.07	
B (Treatment)	3	3.9	1.18	
BC	6	5.8	1.76	
error (between)	69	3.3		
Within	162			
A (Pre-Post1-Post2)	2	8.2	29.46	.001
AC	4	0.8	2.78	.03
AB	6	0.5	1.83	
ABC	12	0.4	1.29	
error (within)	138	0.3		

Note. - Repeated measurements were taken before (Pre) immediately after (Post1) and approximately eight months after treatment (Post2).

Note. - Correlation of age with
pre = 0. 39 p .
post1 - 0. 33 p .
post2 = 0. 40 p .
(d.f. =79)

Table 9.

Three-factor Analysis of Variance
with One Repeated Measure
Criterion =

DEV - Classroom Disturbance

SOURCE	df	MS	F	P<
Between	72			
C (Diagnosis)	2	195.4	4.86	.01
B (Treatment)	3	120.1	2.99	.04
BC	6	67.2	1.67	
error (between)	61	40.2		
Within	146			
A (Pre-Post1-Post2)	2	15.0	1.70	
AC	4	23.6	2.68	.03
AB	6	14.4	1.64	
ABC	12	13.7	1.56	
error (within)	122	8.8		

Note. - Repeated measurements were taken before (Pre) immediately after (Post1) and approximately eight months after treatment (Post2).

Note. - Correlation of age with
pre = 0.26 p .
post1 - 0.28 p .
post2 = 0.30 p .
(d.f. =73)

Table 10.

Treatment Group Means by Diagnostic Category and Time of Testing - Criterion Variable = Devereaux Factor 01

Diagnostic Category		Treatment Group 1	2	3	4
A.	Pre	15.67	16.37	19.80	15.57
	Post 1	13.83	15.25	13.80	15.00
	Post 2	15.83	15.00	12.40	14.71
H	Pre	11.67	16.25	16.50	16.15
	Post 1	13.50	14.75	18.33	12.85
	Post 2	13.17	17.25	16.33	11.15
W	Pre	14.83	11.57	12.75	11.43
	Post 1	15.17	14.85	11.00	8.43
	Post 2	14.33	13.71	9.00	7.43

Table 11

Three-factor Analysis of Variance with One Repeated Measure Criterion =

DEV - Impatience

SOURCE	*df*	*MS*	*F*	*P<*
Between	72			
C (Diagnosis)	2	2.2	<1	
B (Treatment)	3	9.0	<1	
BC	6	49.6	1.17	
error (between)	61	42.4		
Within	146			
A (Pre-Post1-Post2)	2	17.8	<1	
AC	4	20.4	1.11	
AB	6	16.1	<1	
ABC	12	27.7	1.50	
error (within)	122	18.4		

Note. - Repeated measurements were taken before (Pre) immediately after (Post1) and approximately eight months after treatment (Post2).

Note. - Correlation of age with
pre = 0.20 p .
post1 - 0.03 p .
post2 = 0.06 p .
(d.f. = 73)

Table 12

Three-factor Analysis of Variance with One Repeated Measure Criterion =

DEV - Disrespect/Defiance

SOURCE	*df*	*MS*	*F*	*P<*
Between	72			
C (Diagnosis)	2	329.5	9.64	.01
B (Treatment)	3	131.7	3.85	.01
BC	6	42.1	1.23	
error (between)	61	34.2		
Within	146			
A (Pre-Post1-Post2)	2	0.9	<1	
AC	4	17.5	2.27	.07
AB	6	9.0	1.17	
ABC	12	8.7	1.13	
error (within)	122	7.7		

Note. - Repeated measurements were taken before (Pre) immediately after (Post1) and approximately eight months after treatment (Post2).

Note. - Correlation of age with
pre = 0.08 p .
post1 - 0.24 p .
post2 = 0.23 p .
(d.f. =73)

Table 13.

Treatment Group Means by Diagnostic Category and Time of Testing - Criterion Variable = Devereaux Factor 03

Diagnostic Category		Treatment Group 1	2	3	4
A	Pre	13.17	11.62	17.00	11.71
	Post 1	12.50	10.62	12.00	11.57
	Post 2	14.83	11.25	12.60	11.71
H	Pre	10.83	10.50	11.50	8.15
	Post 1	12.17	10.50	15.17	9.57
	Post 2	12.17	12.50	13.17	8.00
W	Pre	9.50	9.72	8.00	7.43
	Post 1	11.50	9.28	5.25	5.15
	Post 2	12.00	8.85	6.00	5.00

Table 14.

Three-factor Analysis of Variance
with One Repeated Measure
Criterion =

DEV - External Blame

SOURCE	*df*	*MS*	*F*	*P<*
Between	72			
C (Diagnosis)	2	63.8	1.21	
B (Treatment)	3	18.8	<1	
BC	6	63.1	1.20	
error (between)	61	52.8		
Within	146			
A (Pre-Post1-Post2)	2	1.2	<1	
AC	4	14.7	1.00	
AB	6	16.5	1.13	
ABC	12	9.1	<1	
error (within)	122	14.7		

Note. - Repeated measurements were taken before (Pre) immediately after (Post1) and approximately eight months after treatment (Post2).

Note. - Correlation of age with
*pre = 0.*05 *p* .
*post1 - 0.*13 *p* .
*post2 = 0.*15 *p* .
*(d.f. =*73 *)*

Table 15.

Three-factor Analysis of Variance
with One Repeated Measure
Criterion =

DEV - Achievement Anxiety

SOURCE	*df*	*MS*	*F*	*P<*
Between	72			
C (Diagnosis)	2	8.7	<1	
B (Treatment)	3	29.9	<1	
BC	6	17.1	<1	
error (between)	61	56.3		
Within	146			
A (Pre-Post1-Post2)	2	1.7	<1	
AC	4	37.3	2.52	.05
AB	6	4.7	<1	
ABC	12	10.4	<1	
error (within)	122	14.8		

Note. - Repeated measurements were taken before (Pre) immediately after (Post1), and approximately eight months after treatment (Post2).

Note. - Correlation of age with
pre = 0.13 p .
post1 - 0.22 p .
post2 = 0.05 p .
(d.f. =73)

Figure 2.

Diagnostic Group 14 Means
by Time of Testing

On the Variable

DEV - Ach. Anxiety

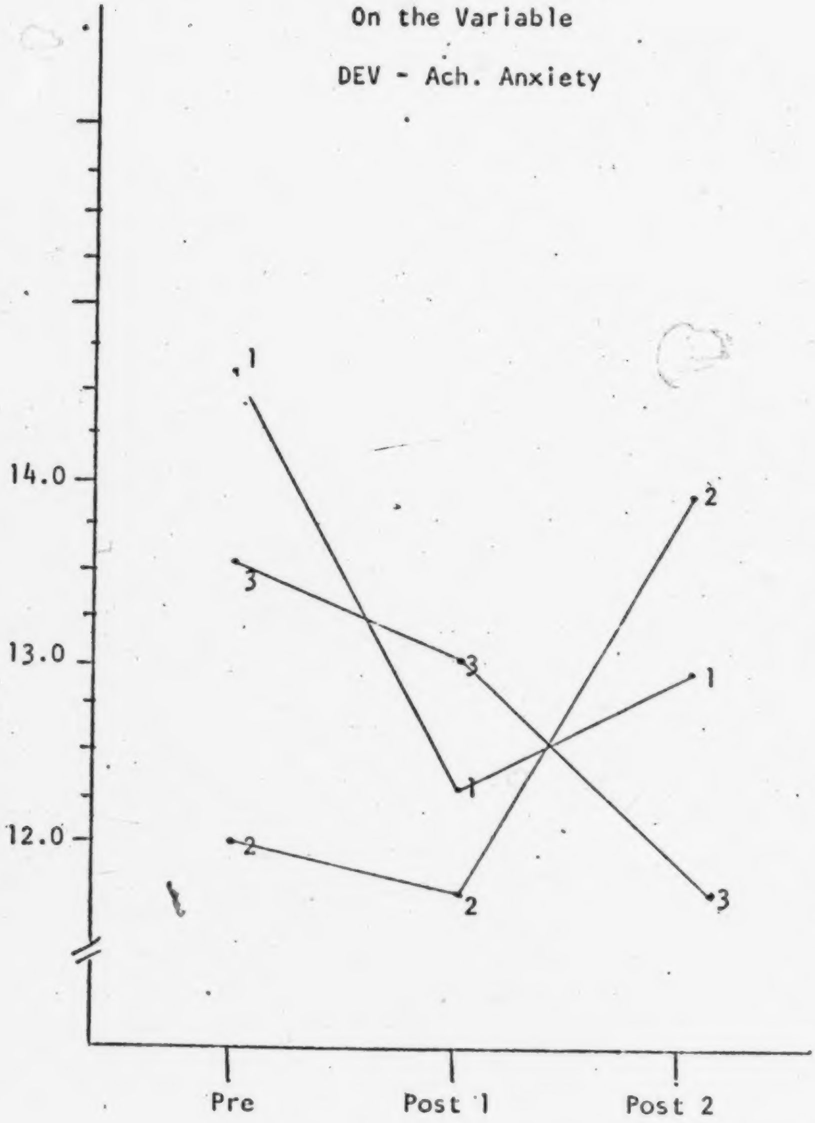


Table 16.

Three-factor Analysis of Variance
with One Repeated Measure
. Criterion =

DEV - External Reliance

SOURCE	*df*	*MS*	*F*	*P<*
Between	72			
C (Diagnosis)	2	71.3	1.24	
B (Treatment)	3	107.8	1.88	
BC	6	59.5	1.04	
error (between)	61	57.4		
Within	146			
A (Pre-Post1-Post2)	2	38.8	2.24	
AC	4	101.7	5.85	.01
AB	6	11.5	<1	
ABC	12	24.4	1.41	
error (within)	122	17.4		

Note. - Repeated measurements were taken before (Pre) immediately after (Post1) and approximately eight months after treatment (Post2).

Note. - Correlation of age with
pre = 0.09 p .
post1 - 0.05 p .
post2 = 0.04 p .
(d.f. =73)

Figure 3.

Diagnostic Group Means
by Time of Testing

On the Variable

DEV. - Ext. Reliance

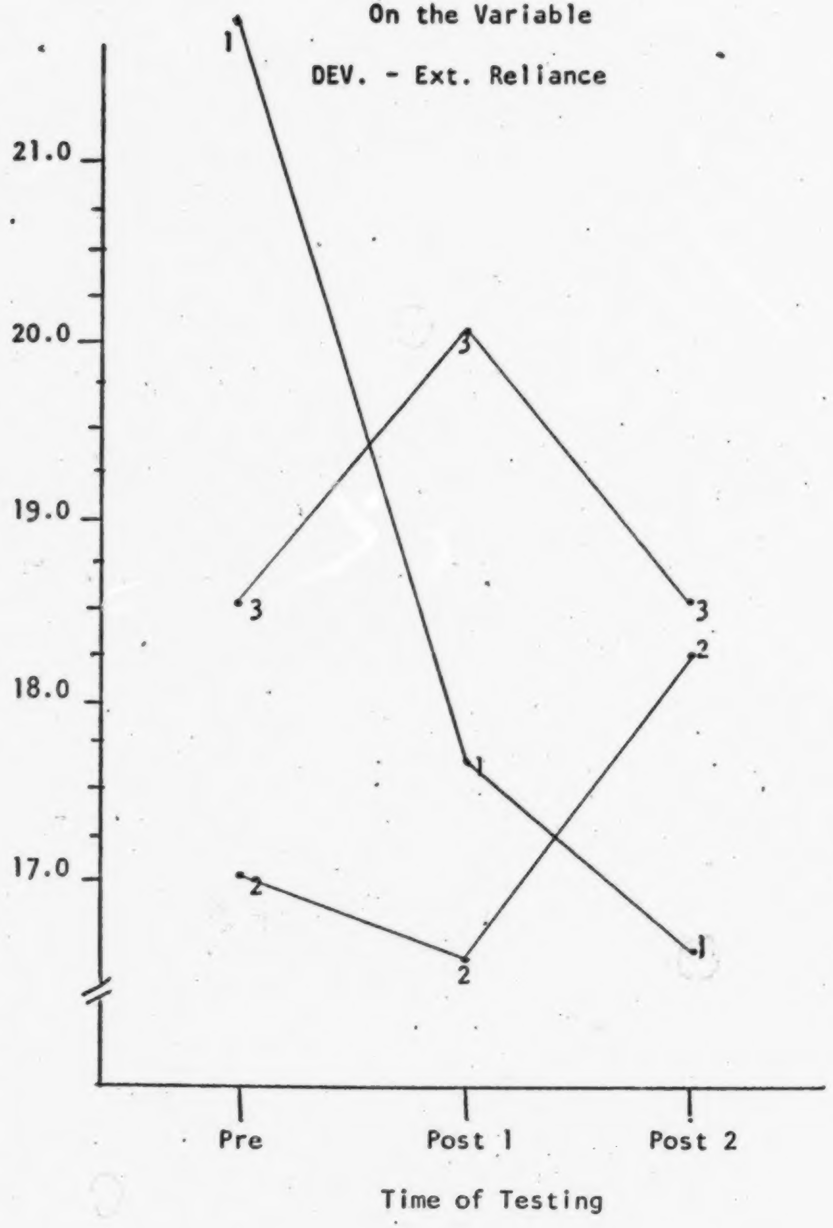


Table 17.

Three-factor Analysis of Variance
with One Repeated Measure
Criterion =

DEV - Comprehension

SOURCE	*df*	*MS*	*F*	*P<*
Between	72			
C (Diagnosis)	2	93.4	5.75	.01
B (Treatment)	3	27.8	1.71	
BC	6	23.8	1.47	
error (between)	61	16.2		
Within	146			
A (Pre-Post1-Post2)	2	13.2	2.45	
AC	4	2.0	<1	
AB	6	3.0	<1	
ABC	12	2.8	<1	
error (within)	122	5.4		

Note. - Repeated measurements were taken before (Pre) immediately after (Post1) and approximately eight months after treatment (Post2).

Note. - Correlation of age with
pre = 0.21 p .
post1 - 0.22 p .
post2 = 0.03 p .
(d.f. =73)

Table 18.

Treatment Group Means by Diagnostic Category and Time of Testing - Criterion Variable = Devereaux Factor 07

Diagnostic Category		Treatment Group			
		1	2	3	4
	Pre	10.33	9.87	10.60	11.15
A	Post 1	10.17	10.62	9.40	9.72
	Post 2	11.17	11.37	11.00	12.15
	Pre	14.50	12.25	12.33	12.29
H	Post 1	13.17	12.75	12.33	12.71
	Post 2	14.17	12.50	13.33	12.43
	Pre	10.83	10.71	9.00	14.57
W	Post 1	12.17	11.14	9.25	12.57
	Post 2	11.00	11.15	10.00	15.15

Table 19.

Three-factor Analysis of Variance with One Repeated Measure Criterion =

DEV - Inattentive/Withdrawn

SOURCE	*df*	*MS*	*F*	*P<*
Between	72			
C (Diagnosis)	2	264.3	7.0	.01
B (Treatment)	3	49.1	1.3	
BC	6	18.8	<1	
error (between)	61	37.8		
Within	146			
A (Pre-Post1-Post2)	2	2.0	<1	
AC	4	24.8	2.03	
AB	6	24.4	2.00	
ABC	12	10.5	<1	
error (within)	122	12.2		

Note. - Repeated measurements were taken before (Pre) immediately after (Post1) and approximately eight months after treatment (Post2).

Note. - Correlation of age with
pre = 0.08 p
post1 - 0.11 p
post2 = 0.17 p
(d.f. = 73)

Table 20.

Treatment Group Means by Diagnostic Category and Time of Testing - Criterion Variable = Devereaux Factor 08

Diagnostic Category		Treatment Group 1	2	3	4
A	Pre	11.50	11.00	14.80	13.00
	Post 1	9.17	8.75	11.60	13.15
	Post 2	9.83	10.00	10.40	11.15
H	Pre	8.50	11.50	12.00	9.57
	Post 1	12.00	7.75	11.33	11.71
	Post 2	12.33	7.50	10.33	11.29
W	Pre	10.00	12.71	16.50	14.71
	Post 1	13.00	15.57	12.25	17.14
	Post 2	14.33	13.43	14.50	15.43

Table 21.

Three-factor Analysis of Variance with One Repeated Measure Criterion =

DEV - Irrelevant-Responsiveness

SOURCE	*df*	*MS*	*F*	*P<*
Between	72			
C (Diagnosis)	2	1.9	<1	
B (Treatment)	3	21.0	1.03	
BC	6	24.1	1.20	
error (between)	61	20.4		
Within	146			
A (Pre-Post1-Post2)	2	22.1	3.15	.05
AC	4	11.4	1.63	
AB	6	6.5	<1	
ABC	12	8.4	1.20	
error (within)	122	7.0		

Note. - Repeated measurements were taken before (Pre) immediately after (Post1) and approximately eight months after treatment (Post2).

Note. - Correlation of age with
pre = 0. 17 *p* .
post1 - 0. 03 *p* .
post2 = 0. 24 *p* .
(d.f. = 73)

Table 22.

Three-factor Analysis of Variance with One Repeated Measure Criterion =

DEV - Creative Initiative

SOURCE	*df*	*MS*	*F*	*P<*
Between	72			
C (Diagnosis)	2	162.4	6.65	.01
B (Treatment)	3	44.8	1.83	
BC	6	17.2	<1	
error (between)	61	24.4		
Within	146			
A (Pre-Post1-Post2)	2	18.8	2.40	
AC	4	4.9	<1	
AB	6	5.6	<1	
ABC	12	8.7	1.11	
error (within)	122	7.8		

Note. - Repeated measurements were taken before (Pre) immediately after (Post1) and approximately eight months after treatment (Post2).

Note. - Correlation of age with
pre = 0.05 p .
post1 - 0.01 p .
post2 = 0.06 p .
(d.f. =73)

Table 23.

Treatment Group Means by Diagnostic Category and Time of Testing - Criterion Variable = Devereaux Factor 10

Diagnostic Category		Treatment Group			
		1	2	3	4
	Pre	11.00	12.62	7.40	10.71
A	Post 1	10.17	11.50	11.00	8.28
	Post 2	12.00	12.12	12.60	11.85
	Pre	14.17	12.00	11.17	12.85
H	Post 1	12.83	14.00	10.67	12.29
	Post 2	12.17	15.00	11.17	12.85
	Pre	10.50	9.43	7.75	9.28
W	Post 1	10.67	10.57	6.50	8.00
	Post 2	11.83	10.00	6.50	10.00

Figure 4.

Diagnostic Group Means Plotted by Treatment Group on the Variable

DEV - Need Closeness to Teacher

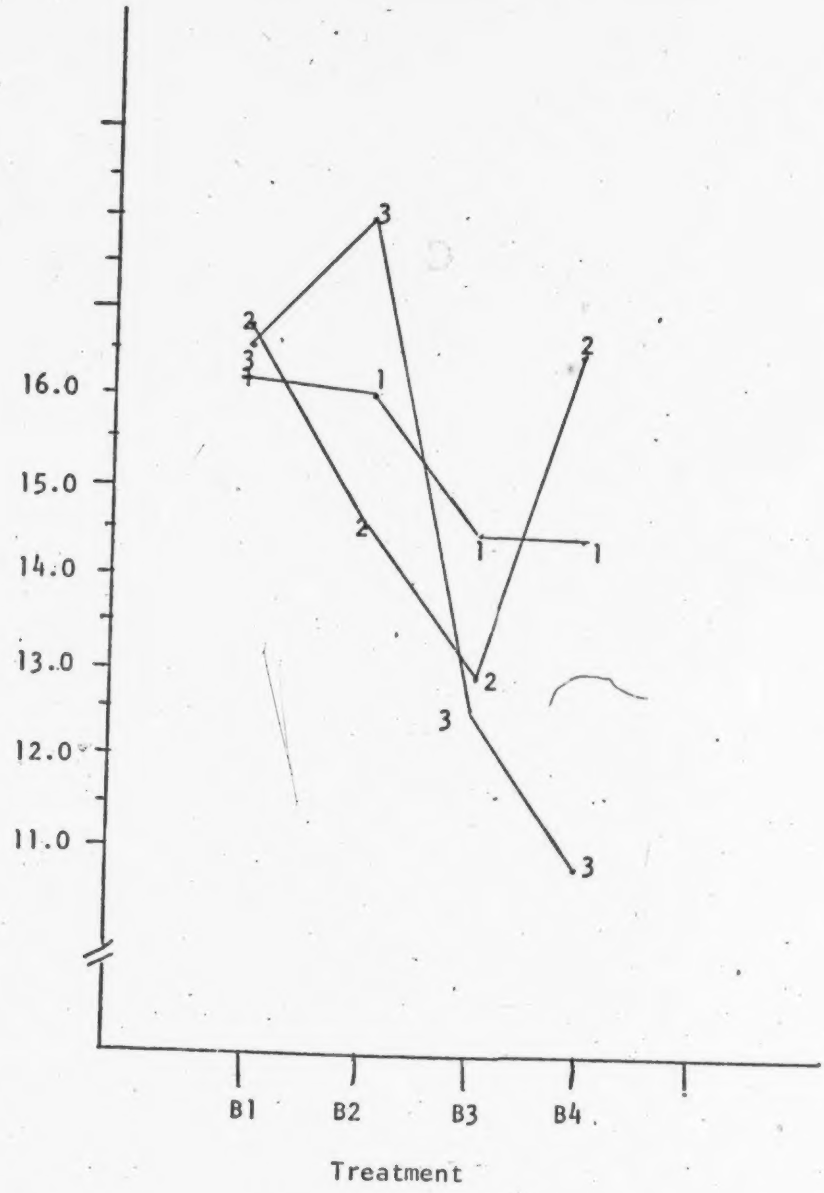
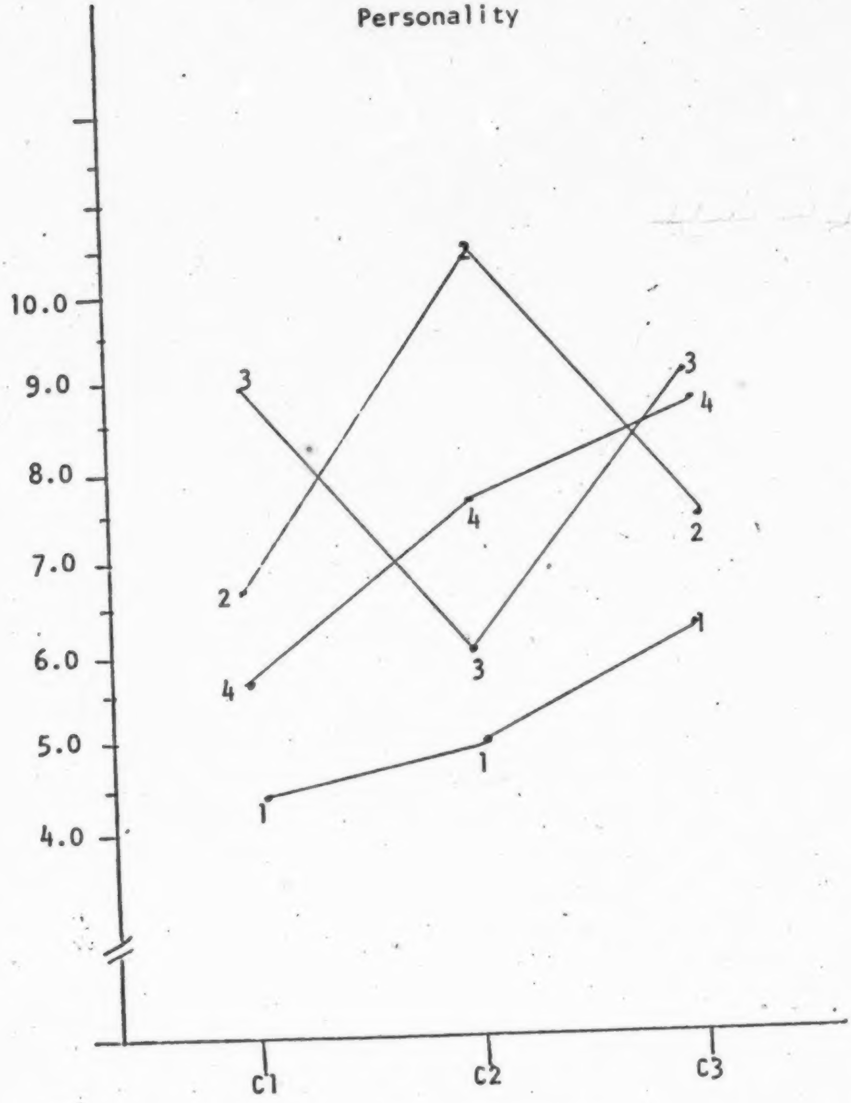


Figure 5.

Treatment Means (adjusted)
Plotted for the Diagnostic Groups

on the Variable

Personality



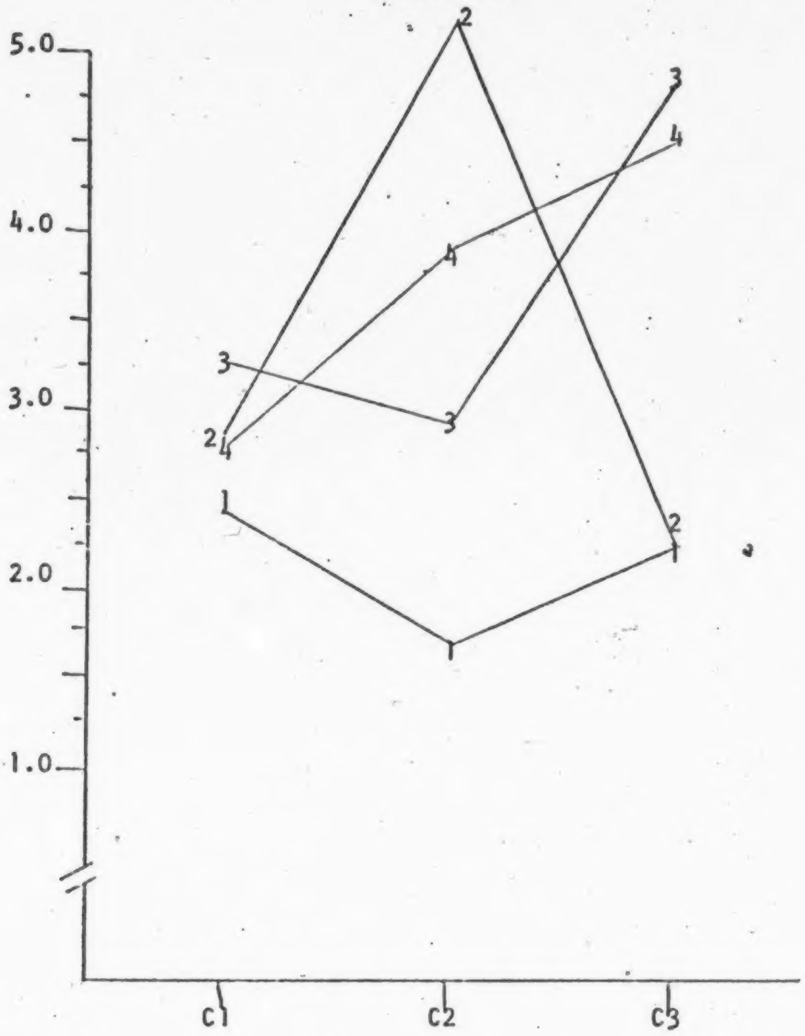
Time of Testing

Figure 6.

Treatment Means (adjusted)
Plotted for the Diagnostic Groups

on the Variable

Immaturity



Diagnostic Group

Table 24.

Three-factor Analysis of Variance
with One Repeated Measure
Criterion =

DEV - Need Closeness To Teacher

SOURCE	*df*	*MS*	*F*	*P<*
Between	72			
C (Diagnosis)	2	15.3	<1	
B (Treatment)	3	125.4	4.03	.01
BC	6	72.4	2.32	.04
error (between)	61	31.2		
Within	146			
A (Pre-Post1-Post2)	2	51.4	4.76	.01
AC	4	0.8	<1	
AB	6	9.4	<1	
ABC	12	10.6	<1	
error (within)	122	10.8		

Note. - Repeated measurements were taken before (Pre) immediately after (Post1) and approximately eight months after treatment (Post2).

Note. - Correlation of age with
pre = 0.14 p .
post1 - 0.07 p .
post2 = 0.08 p .
(d.f. = 73)

Table 25.

Analysis of Covariance for the Variable

Quay's Checklist Scale
Conduct

SOURCE	*df*	*MS*	*F*	*P* <
Within	62	21.4		
Regression	1	226.1	10.58	.002
A (Diagnosis)	2	30.3	1.42	
B (Treatment)	3	1.7	<1	
AB	6	25.1	1.17	
Test of Equality of Regression Coefficients				
Within	51	21.9		
Regression	11	19.1	<1	

Note. - Pre-test = covariate Post-test = variate

Note. - Correlation of age with
pre-test = 0. P .
post-test = 0. P .
(d.f. =)

Table 26.

Analysis of Covariance for the Variable

Quay's Checklist Scale Personality

SOURCE	*df*	*MS*	*F*	*P <*
Within		8.2		
Regression		50.1	6.10	.02
A (Diagnosis)		14.5	1.76	
B (Treatment)		30.0	3.66	.02
AB		15.7	1.92	
Test of Equality of Regression Coefficients				
Within		8.7		
Regression		6.1	<1	

Note. - Pre-test = covariate Post-test = variate

Note. - Correlation of age with
pre-test = 0. *P* .
post-test = 0. *P* .
(d.f. =)

Table 27.

Analysis of Covariance
for the Variable

Quay's Checklist Scale

Immaturity

SOURCE	*df*	*MS*	*F*	*P<*
Within		3.6		
Regression		4.5	1.25	
A (Diagnosis)		2.4	<1	
B (Treatment)		9.3	2.60	.06
AB		6.7	1.87	
Test of Equality of Regression Coefficients				
Within		3.3		
Regression		4.9	1.49	

Note. - Pre-test = covariate Post-test = variate

Note. - Correlation of age with
pre-test = 0. *P* .
post-test = 0. *P* .
(d.f. =)

Table 28.

Analysis of Covariance for the Variable

Quay's Checklist Scale

Socialized Delinquency

SOURCE	*df*	*MS*	*F*	*P<*
Within		0.9		
Regression		6.9	7.44	.008
A (Diagnosis)		4.2	4.58	.01
B (Treatment)		1.4	1.48	
AB		1.3	1.46	
Test of Equality of Regression Coefficients				
Within		0.9		
Regression		1.0	1.16	

Note. - Pre-test = covariate. Post-test = variate

Note. - Correlation of age with
pre-test = 0. P .
post-test = 0. P .
(d.f. =)

Table 29.

Analysis of Covariance for the Variable

Draw-A-Person Test

Male Fiture

SOURCE	*df*	*MS*	*F*	*P<*
Within		117.7		
Regression		1471.9	12.51	.001
A (Diagnosis)		240.8	2.05	
B (Treatment)		159.2	1.35	
AB		309.4	2.63	.025
		Test of Equality of Regression Coefficients		
Within		116.1		
Regression		124.8	1.08	

Note. - Pre-test = covariate Post-test = variate

Note. - Correlation of age with
pre-test = 0. *P* .
post-test = 0. *P* .
(d.f. =)

Figure 7.

Treatment Means Plotted
for the Diagnostic Groups-

on the Variable
DAP-Male Figure

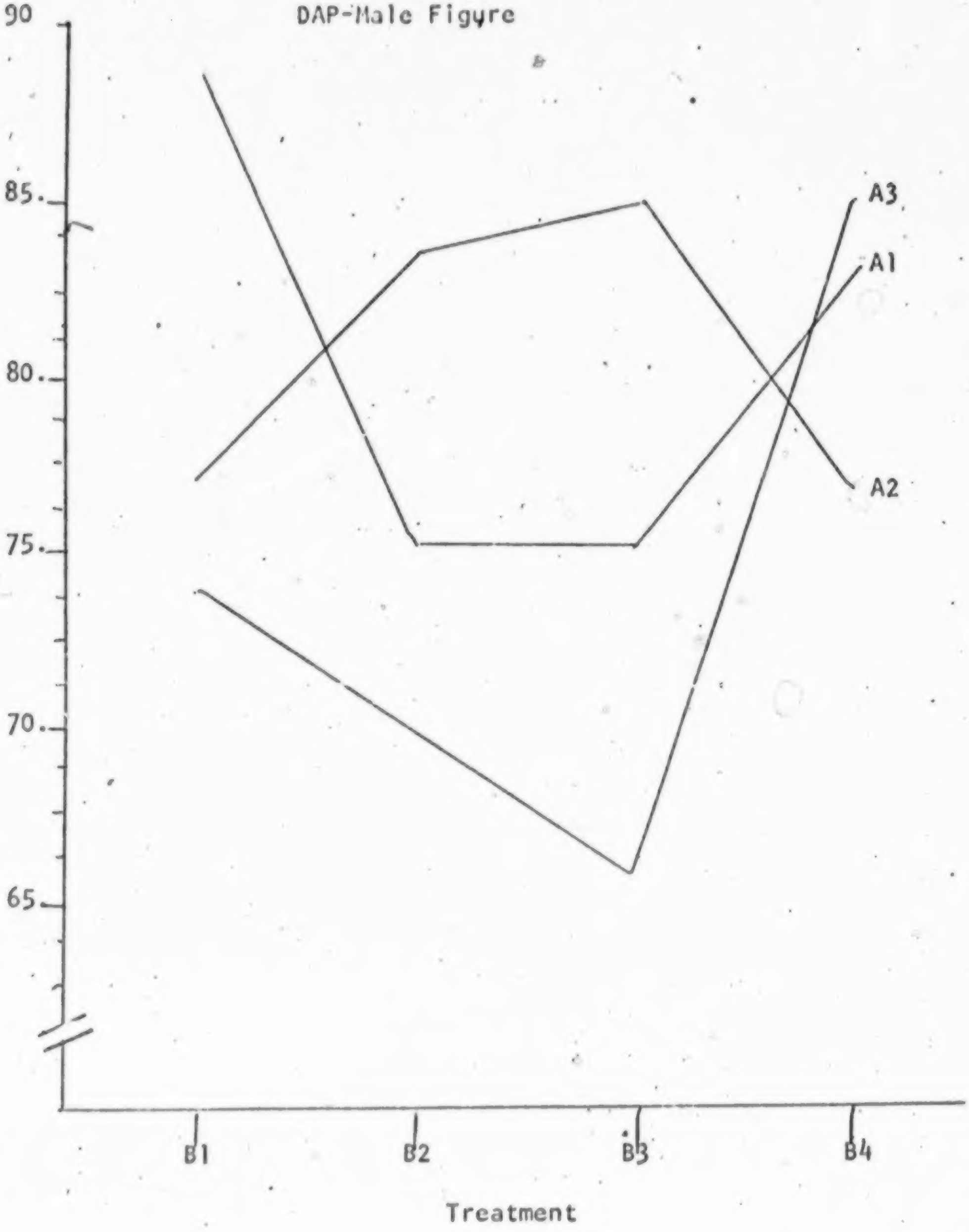


Table 30.

Analysis of Covariance
for the Variable

Draw-A-Person Test

Female Figure

SOURCE	*df*	*MS*	*F*	*P<*
Within		129.0		
Regression		871.9	6.76	.01
A (Diagnosis)		93.4	<1	
B (Treatment)		166.9	1.29	
AB		289.5	2.24	.05
Test of Equality of Regression Coefficients				
Within		111.0		
Regression		207.4	1.87	

Note. - Pre-test = covariate, Post-test = variate

Note. - Correlation of age with
pre-test = 0. *P* .
post-test = 0. *P* .
(d.f. =)

Figure 8.

Treatment Means Plotted
for the Diagnostic Groups-

on the Variable

DAP-Female Fiture

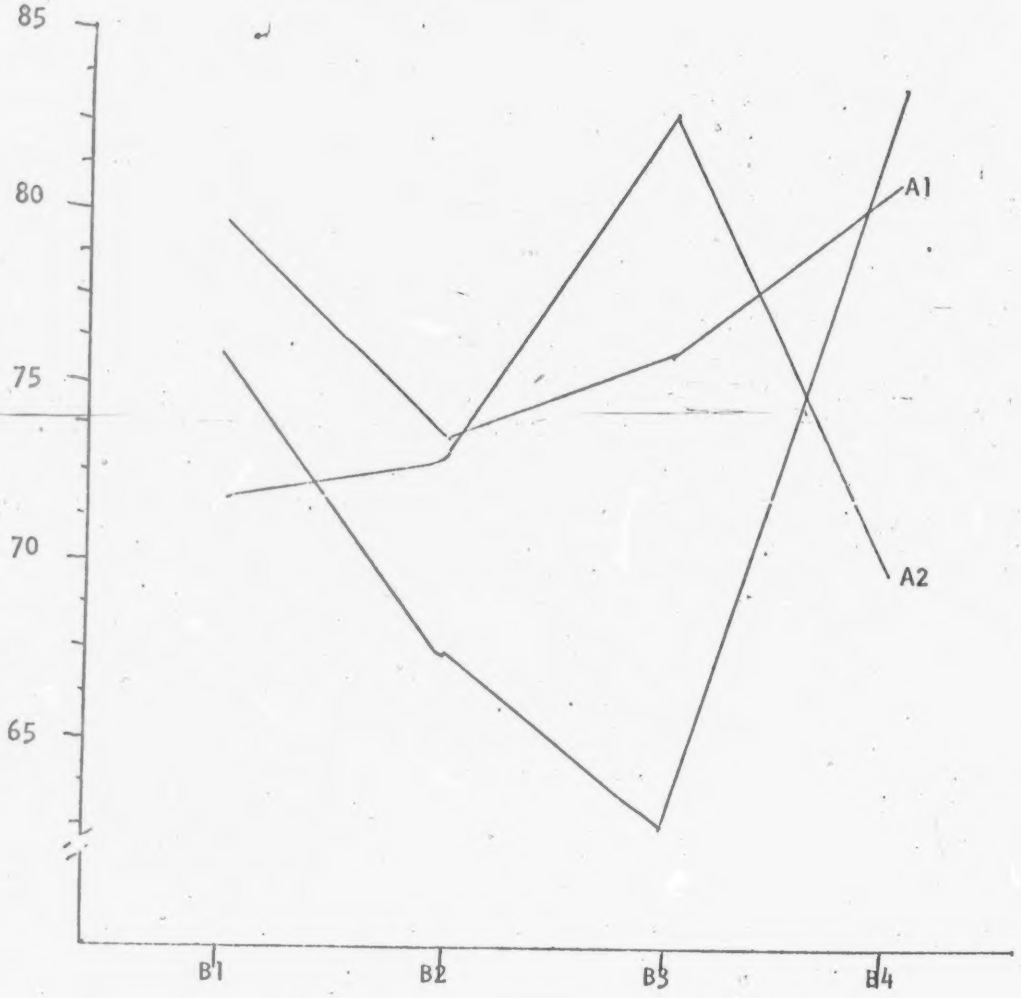


Table 31.

Analysis of Covariance for the Variable

Zig Zag Run

SOURCE	*df*	*MS*	*F*	*P*<
Within	62	3.3		
Regression	1	28.7	8.67	.01
A (Diagnosis)	2	8.2	2.48	
B (Treatment)	3	3.3	<1	
AB	6	2.3	<1	

Test of Equality of Regression Coefficients

Within	51	2.6		
Regression	11	6.4	2.43	.02

Note. - Pre-test = covariate. Post-test = variate

Note. - Correlation of age with
pre-test = 0. 26 *P* .
post-test = 0. 14 *P*> .
(d.f. =73)

Table 32.

Analysis of Covariance
for the Variable

Shuttle Run

SOURCE	*df*	*MS*	*F*	*P<*
Within	61	18.9		
Regression	1	736.5	39.05	.001
A (Diagnosis)	2	95.9	5.08	.009
B (Treatment)	3	56.8	3.01	.04
AB	6	8.1	<1	
Test of Equality of Regression Coefficients				
Within	50	18.9		
Regression	11	18.7	<1	

Note. - Pre-test = covariate. Post-test = variate

Note. - Correlation of age with
pre-test = 0.04 P .
post-test = 0.14 P .
(d.f. =)

Figure 9.

Adjusted Treatment Means Plotted for the Diagnostic Groups-

on the Variable Shuttle Run

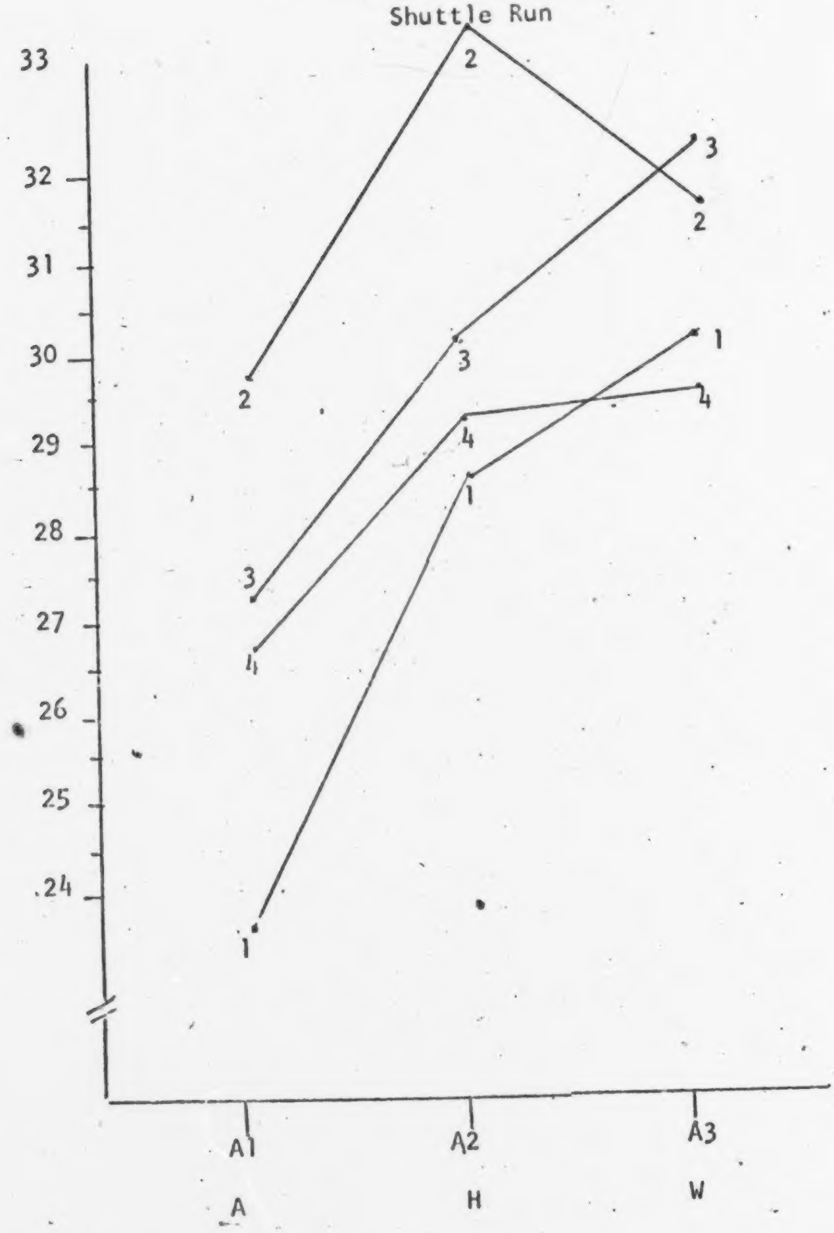


Table 33.

Analysis of Covariance for the Variable

Balance A Test

SOURCE	*df*	*MS*	*F*	*P<*
Within	62	1.8		
Regression	1	0.7	<1	
A (Diagnosis)	2	5.2	2.93	.07
B (Treatment)	3	0.3	<1	
AB	6	1.2	<1	

Test of Equality of Regression Coefficients

Within	51	1.7		
Regression	11	2.0	1.14	

Note. - Pre-test = covariate Post-test = variate

Note. - Correlation of age with
*pre-test = 0.*12 *P* .
*post-test = 0.*32 *P* .
(d.f. =73)

Table 34.

Analysis of Covariance for the Variable

Tapered Balance Beam

SOURCE	df	MS	F	P<
Within	62	853.2		
Regression	1	5956.4	6.98	.01
A (Diagnosis)	2	57.6	<1	
B (Treatment)	3	56.6	<1	
AB	6	2453.6	2.88	.02

Test of Equality of Regression Coefficients

Within	51	778.5		
Regression	11	1199.4	1.54	

Note. - Pre-test = covariate. Post-test = variate

Note. - Correlation of age with
pre-test = 0.26 P .
post-test = 0.00 P = 0.00
(d.f. =73)

Figure 10.

Adjusted Treatment Means Plotted
for the Diagnostic Groups-

on the Variable

Tapered Balance Beam

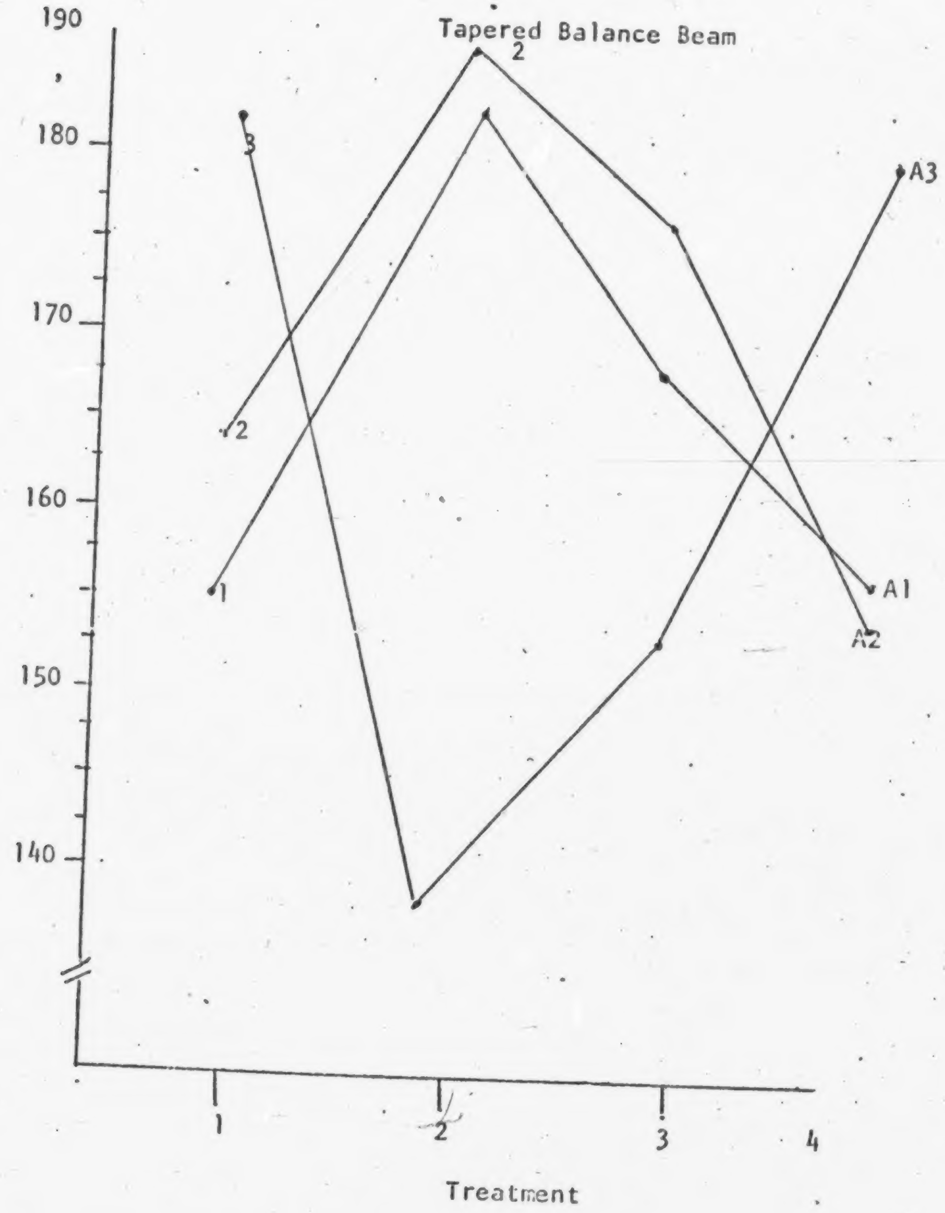


Table 35.

Analysis of Covariance for the Variable

Lung Capacity

SOURCE	*df*	*MS*	*F*	*P<*
Within	62	1171.0		
Regression	1	2679.9	2.29	
A (Diagnosis)	2	1110.0	<1	
B (Treatment)	3	1191.0	1.02	
AB	6	1194.4	1.02	
Test of Equality of Regression Coefficients				
Within	51	538.5		
Regression	11	4103.7	7.62	.001

Note. - Pre-test = covariate. Post-test = variate

Note. - Correlation of age with
pre-test = 0. 61 *P* .
post-test = 0. 25 *P* .
(d.f. =73)

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Table 36.

Analysis of Covariance for the Variable

600 Yard Run-Walk

SOURCE	df	MS	F	P<
Within	62	3177.7		
Regression	1	12128.1	3.82	.06
A (Diagnosis)	2	1106.7	<1	
B (Treatment)	3	1045.4	<1	
AB	6	1882.1	<1	
Test of Equality of Regression Coefficients				
Within	51	2642.9		
Regression	11	5656.8	2.14	.04

Note. - Pre-test = covariate Post-test = variate

Note. - Correlation of age with
pre-test = 0.40 *P*
post-test = 0.00 *P=* 0.00
(d.f. =73)

Table 37.

Analysis of Covariance for the Variable

300 Yard Dash

SOURCE	*df*	*MS*	*F*	*P*<
Within	62	444.2		
Regression	1	13331.3	30.01	.001
A (Diagnosis)	2	42.0	<1	
B (Treatment)	3	976.3	2.20	
AB	1	197.8	<1	
Test of Equality of Regression Coefficients				
Within	51	351.6		
Regression	11	873.5	2.48	.02

Note. - Pre-test = covariate. Post-test = variate

Note. - Correlation of age with
pre-test = 0.33 P .
post-test = 0.21 P .
(d.f. =73)

Table 38.

Analysis of Covariance for the Variable

Modified Harvard Step Test

SOURCE	*df*	*MS*	*F*	*P<*
Within	62	159.3		
Regression	1	41.9	<1	
A (Diagnosis)	2	114.4	<1	
B (Treatment)	3	138.9	<1	
AB	6	224.7	1.41	
Test of Equality of Regression Coefficients				
Within	51	154.5		
Regression	11	181.8	1.18	

Note. - Pre-test = covariate. Post-test = variate

Note. - Correlation of age with
pre-test = 0.12 P .
post-test = 0.02 P .
(d.f. =73)

Table 39.

Analysis of Covariance for the Variable

Cable Jump (5)

SOURCE	*df*	*MS*	*F*	*P<*
Within	62	2.6		
Regression	1	45.7	17.36	.001
A (Diagnosis)	2	3.3	1.26	
B (Treatment)	3	4.5	1.73	
AB	6	8.6	3.28	.007

Test of Equality of Regression Coefficients

Within	51	3.0		
Regression	11	1.0	<1	

Note. - Pre-test = covariate. Post-test = variate

Note. - Correlation of age with
pre-test = 0.18 *P* .
post-test = 0.12 *P* .
(d.f. =)

Table 40.

Analysis of Covariance
for the Variable

Cable Jump (10)

SOURCE	*df*	*MS*	*F*	*P*<
Within	59	4.4		
Regression	1	115.0	26.13	.001
A (Diagnosis)	2	7.4	1.67	
B (Treatment)	3	3.2	<1	
AB	6	9.6	2.17	.06

Test of Equality of Regression Coefficients

Within	48	4.4		
Regression	11	4.3	<1	

Note. - Pre-test = covariate. Post-test = variate

Note. - Correlation of age with
pre-test = 0.19 *P* .
post-test = 0.15 *P* .
(d.f. = 79

Table 41.

Analysis of Covariance for the Variable

Throw and Catch

SOURCE	*df*	*MS*	*F*	*P <*
Within	62	36.5		
Regression	1	4681.3	128.21	.001
A (Diagnosis)	2	27.6	<1	
B (Treatment)	3	95.9	2.62	.06
AB	6	44.6	1.22	
Test of Equality of Regression Coefficients				
Within	51	37.7		
Regression	11	30.9	<1	

Note. - Pre-test = covariate. Post-test = variate

Note. - Correlation of age with
pre-test = 0.53 P .
post-test = 0.48 P .
(d.f. =73)

Figure 11.

Adjusted Treatment Means Plotted
for the Diagnostic Groups

on the Variable

Throw and Catch

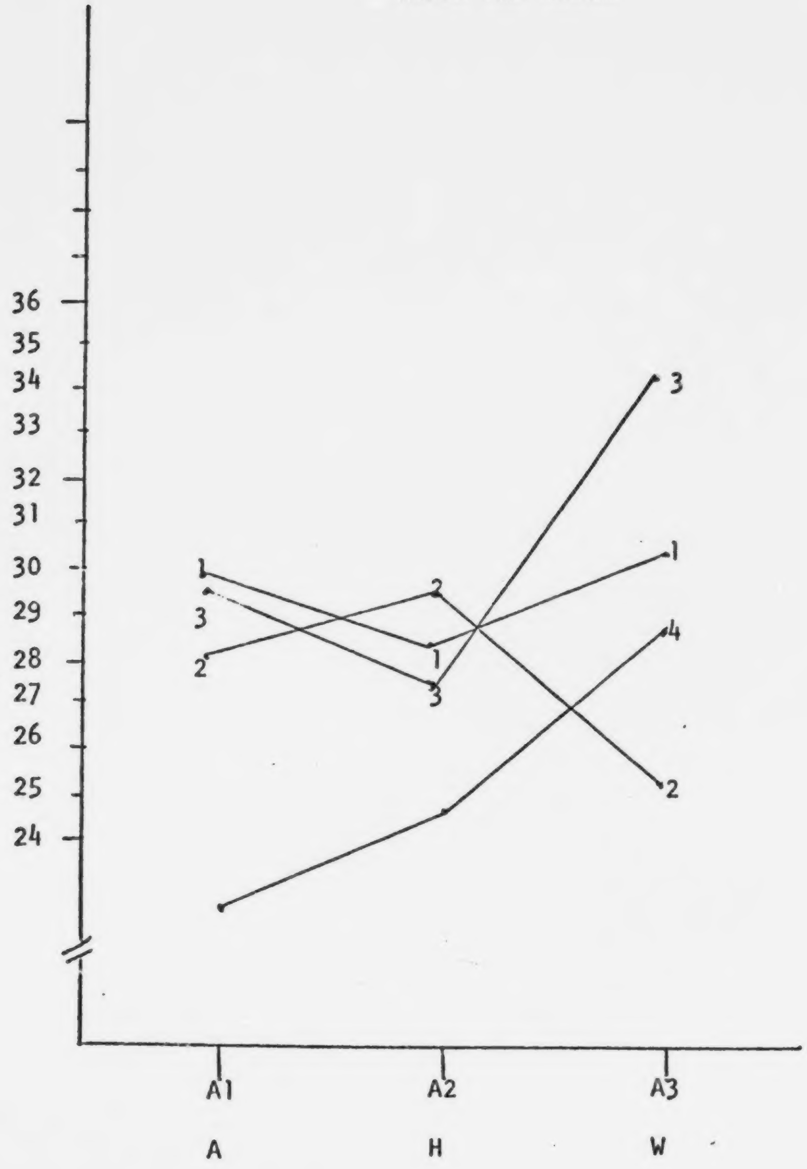


Table 42.

Analysis of Covariance for the Variable

Arm Strength

SOURCE	*df*	*MS*	*F*	*P<*
Within	62	275.3		
Regression	1	19883.9	72.23	.001
A (Diagnosis)	2	244.6	<1	
B (Treatment)	3	338.6	1.23	
AB	6	60.9	<1	
Test of Equality of Regression Coefficients				
Within	51	133.3		
Regression	11	933.6	7.00	.001

Note. - Pre-test = covariate Post-test = variate

Note. - Correlation of age with
pre-test = 0. 32 P .
post-test = 0. 33 P .
(d.f. =73)

Table 43.

Analysis of Covariance for the Variable

Leg Lift

SOURCE	*df*	*MS*	*F*	*P <*
Within	62	31.8		
Regression	1	218.4	6.87	.01
A (Diagnosis)	2	202.4	6.36	.003
B (Treatment)	3	40.0	1.26	
AB	6	20.5	<1	
Test of Equality of Regression Coefficients				
Within	51	33.5		
Regression	11	23.8	<1	

Note. - Pre-test = covariate. Post-test = variate

Note. - Correlation of age with
pre-test = 0. 41 *P* .
post-test = 0. 30 *P* .
(d.f. =73*)*

Table 44.

Analysis of Covariance for the Variable

Pull-Ups

SOURCE	*df*	*MS*	*F*	*P<*
Within	62	1.5		
Regression	1	89.5	58.12	.001
A (Diagnosis)	2	1.6	1.05	
B (Treatment)	3	2.3	1.52	
AB	6	1.6	1.02	
Test of Equality of Regression Coefficients				
Within	51	1.3		
Regression	11	2.8	2.20	.03

Note. - Pre-test = covariate. Post-test = variate

Note. - Correlation of age with
pre-test = 0.05 P
post-test = 0.05 P .
(d.f. =73)

Table 45.

Analysis of Covariance for the Variable

Push-Ups

SOURCE	*df*	*MS*	*F*	*P<*
Within	62	0.7		
Regression	1	20.4	28.9	.001
A (Diagnosis)	2	0.5	<1	
B (Treatment)	3	0.1	<1	
AB	6	0.7	<1	

Test of Equality of Regression Coefficients

Within	51	0.6		
Regression	11	1.3	2.30	.03

Note. - Pre-test = covariate. Post-test = variate

Note. - Correlation of age with
pre-test = 0.07 P .
post-test = 0.07 P .
(d.f. =73)

Table 46.

Analysis of Covariance for the Variable

Dynamic Flexibility

SOURCE	*df*	*MS*	*F*	*P<*
Within	62	10.1		
Regression	1	192.8	19.09	.001
A (Diagnosis)	2	72.4	7.17	.002
B (Treatment)	3	8.2	<1	
AB	6	14.4	1.43	
Test of Equality of Regression Coefficients				
Within	51	10.0		
Regression	11	10.5	1.06	

Note. - Pre-test = covariate. Post-test = variate

Note. - Correlation of age with
pre-test = 0.09 P .
post-test = 0.13 P .
(d.f. =73)

Table 47.

Analysis of Covariance
for the Variable

Extent Flexibility

SOURCE	*df*	*MS*	*F*	*P<*
Within	62	58.2		
Regression	1	382.1	6.56	.02
A (Diagnosis)	2	46.7	<1	
B (Treatment)	3	66.4	1.14	
AB	6	150.3	2.58	.03
Test of Equality of Regression Coefficients				
Within	51	61.8		
Regression	11	41.7	<1	

Note. - Pre-test = covariate. Post-test = variate

Note. - Correlation of age with
pre-test = 0.09 P .
post-test = 0.20 P .
(d.f. =73)

Figure 12.

Adjusted Treatment Means Plotted for the Diagnostic Groups-

on the Variable

Extent Flexibility

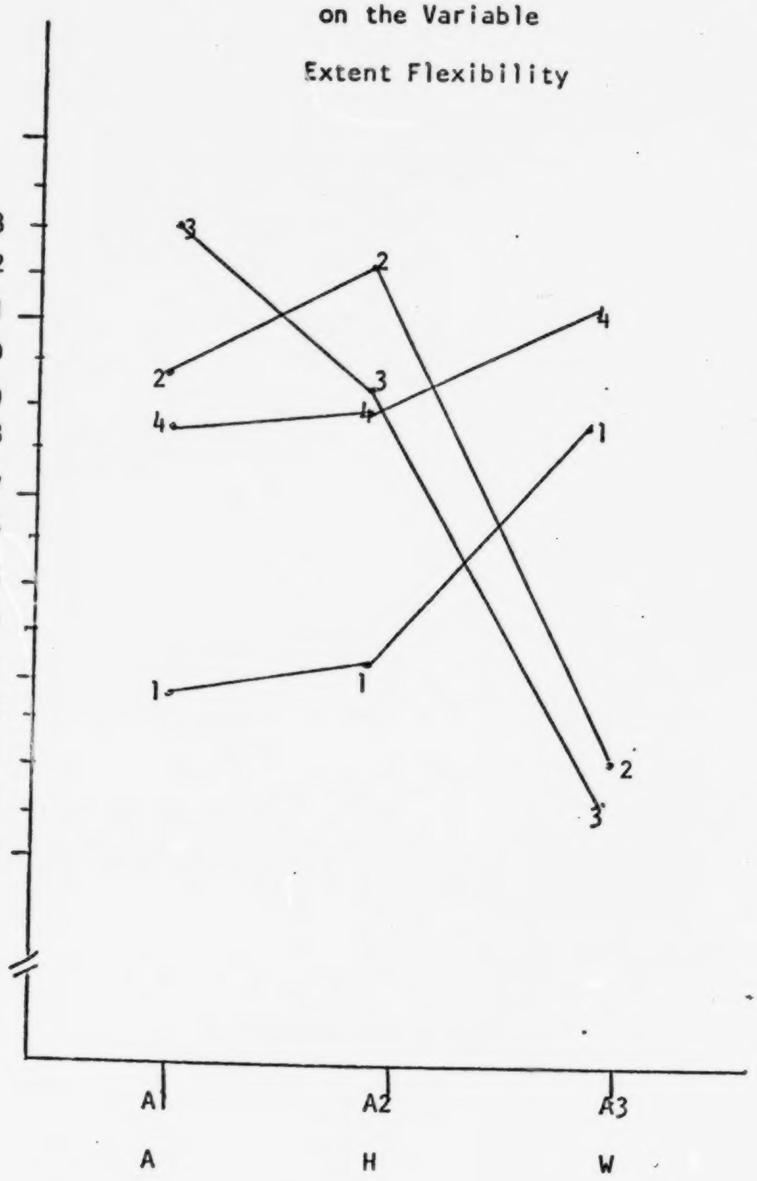


Table 48.

Analysis of Covariance for the Variable

Flex Test

SOURCE	*df*	*MS*	*F*	*P<*
Within	62	18.8		
Regression	1	239.2	12.74	.001
A (Diagnosis)	2	4.9	<1	
B (Treatment)	3	5.0	<1	
AB	6	19.1	1.02	
Test of Equality of Regression Coefficients				
Within	51	18.5		
Regression	11	20.3	1.10	

Note. - Pre-test = covariate. Post-test = variate

Note. - Correlation of age with
pre-test = 0.02 P .
post-test = 0.07 P .
(d.f. =73)

Table 49.

Analysis of Covariance for the Variable

Kinesthesiometer

SOURCE	*df*	*MS*	*F*	*P <*
Within	62	4656.8		
Regression	1	7985.8	1.72	
A (Diagnosis)	2	346.0	<1	
B (Treatment)	3	1468.5	<1	
AB	6	7965.6	1.71	
Test of Equality of Regression Coefficients				
Within	51	5104.1		
Regression	11	2664.2	<1	

Note. - Pre-test = covariate. Post-test = variate

Note. - Correlation of age with
pre-test = 0.32 P .
post-test = 0.29 P .
(d.f. =73)

Table 50.

Analysis of Covariance for the Variable

Kinesthesiometer
(Sign Included)

SOURCE	*df*	*MS*	*F*	*P* <
Within	62	10078.2		
Regression	1	9603.6	<1	
A (Diagnosis)	2	4429.3	<1	
B (Treatment)	3	4785.9	<1	
AB	6	5417.1	<1	
Test of Equality of Regression Coefficients				
Within	51	9761.5		
Regression	11	11488.8	1.18	

Note. - Pre-test = covariate. Post-test = variate

Note. - Correlation of age with
pre-test = 0.03 *P* .
post-test = 0.05 *P* .
(d.f. =73)

Table 51.

Analysis of Covariance for the Variable

Curl Up

SOURCE	*df*	*MS*	*F*	*P* <
Within	62	173.2		
Regression	1	3284.9	18.97	.001
A (Diagnosis)	2	187.9	1.08	
B (Treatment)	3	659.5	3.81	.02
AB	6	141.6	<1	
Test of Equality of Regression Coefficients				
Within	51	162.0		
Regression	11	224.1	1.38	

Note. - Pre-test = covariate, Post-test = variate

Note. - Correlation of age with
pre-test = 0.06 *P* .
post-test = 0.18 *P* .
(d.f. =73)

Figure 13.

Treatment Means Plotted
for the Diagnostic Group -

on the Variable

Curl Up

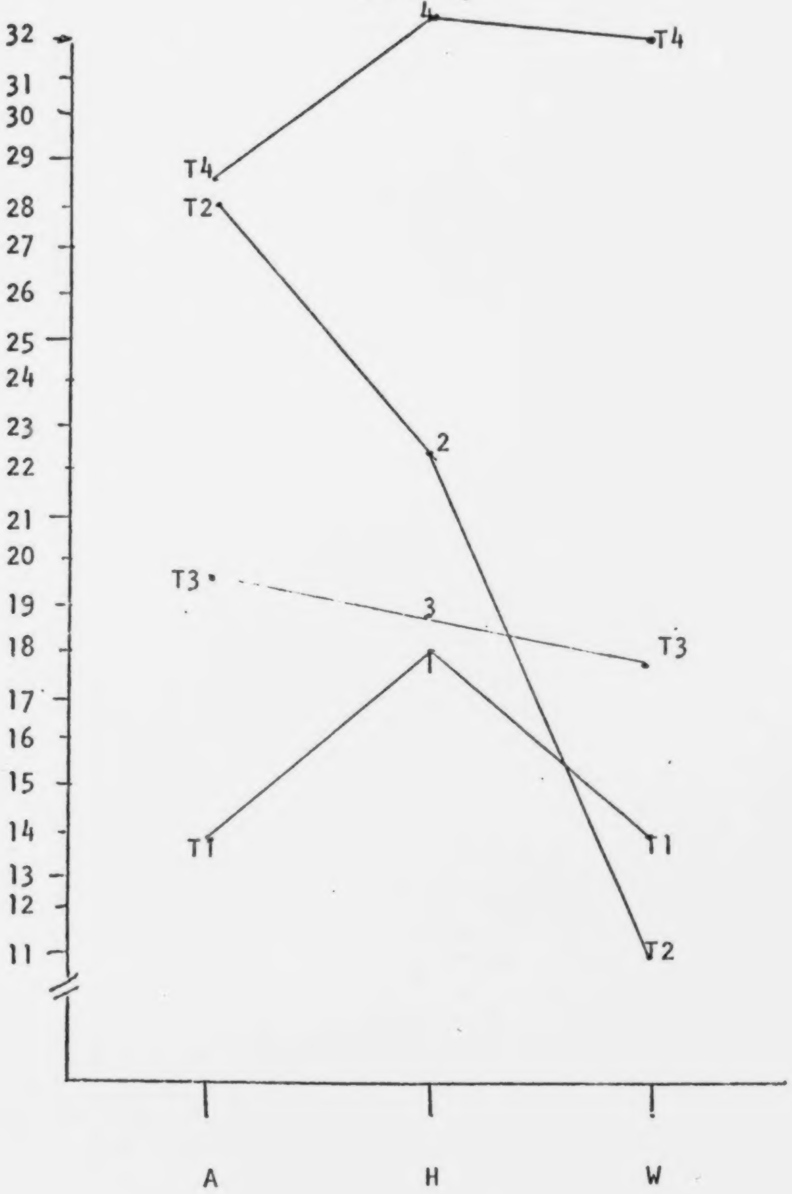


Table 52.

Analysis of Covariance for the Variable

Flexed Arm Hang

SOURCE	*df*	*MS*	*F*	*P <*
Within	62	63.5		
Regression	1	2245.1	35.97	.001
A (Diagnosis)	2	208.4	3.28	.04
B (Treatment)	3	319.9	5.04	.003
AB	6	107.5	1.69	
Test of Equality of Regression Coefficients				
Within	51	53.0		
Regression	11	111.9	2.11	.04

Note. - Pre-test = covariate. Post-test = variate

Note. - Correlation of age with
pre-test = 0.13 P .
post-test = 0.04 P .
(d.f. =73)

Figure 14.

Adjusted Treatment Means Plotted
for the Diagnostic Group-

on the Variable

Flexed Arm Hang

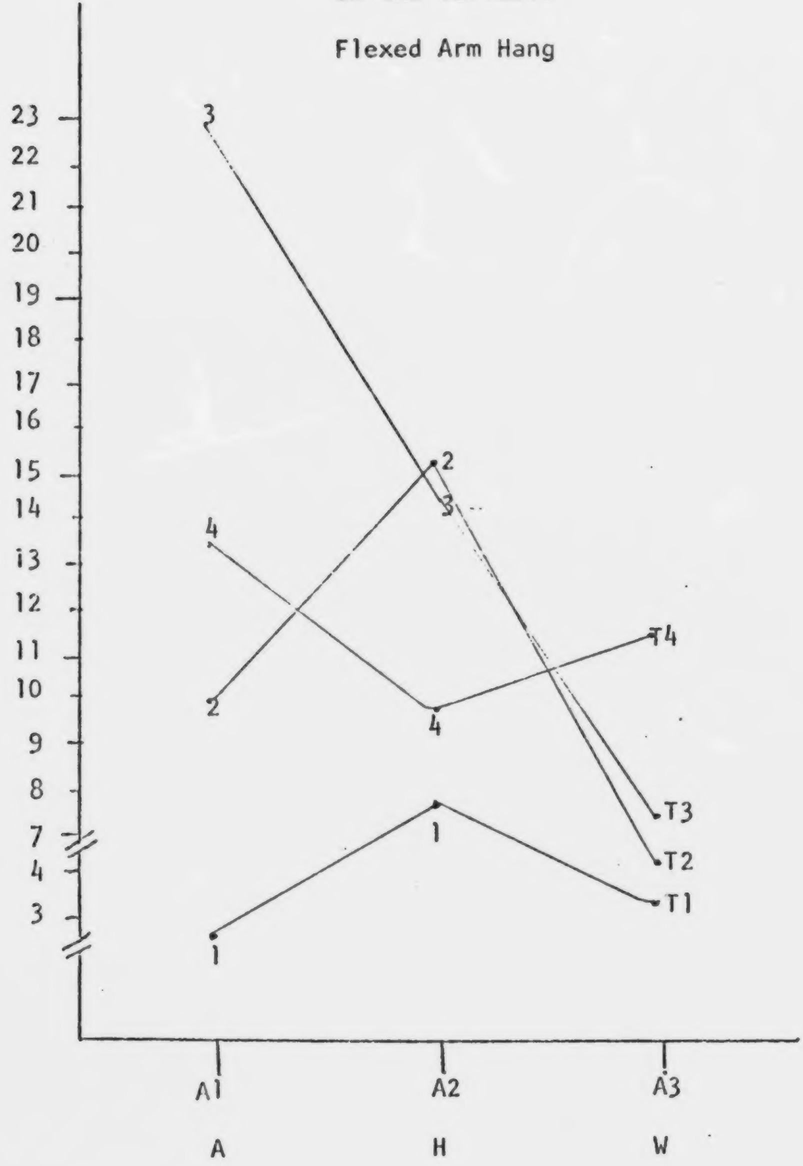


Table 53.

Analysis of Covariance for the Variable

Squat Jump

SOURCE	df	MS	F	P<
Within	62	35.2		
Regression	1	82.9	2.36	
A (Diagnosis)	2	94.9	2.70	
B (Treatment)	3	2.1	<1	
AB	6	32.1	<1	

Test of Equality of Regression Coefficients

SOURCE	df	MS	F	P<
Within	51	32.7		
Regression	11	46.6	1.42	

Note. - Pre-test = covariate. Post-test = variate

Note. - Correlation of age with
pre-test = 0.08 P .
post-test = 0.14 P .
(d.f. =73)

Table 54.

Analysis of Covariance
for the Variable

Ball Throw

SOURCE	*df*	*MS*	*F*	*P* <
Within	62	91.0		
Regression	1	24242.5	266.26	.001
A (Diagnosis)	2	107.1	1.18	
B (Treatment)	3	108.2	1.19	
AB	6	101.6	1.12	
Test of Equality of Regression Coefficients				
Within	51	98.4		
Regression	11	57.1	<1	

Note. - Pre-test = covariate. Post-test = variate

Note. - Correlation of age with
pre-test = 0.38 *P* .
post-test = 0.31 *P* .
(d.f. =73)

Table 55.

Analysis of Covariance for the Variable

Shot Put

SOURCE	df	MS	F	P<
Within	62	10.1		
Regression	1	1589.9	157.92	.001
A (Diagnosis)	2	0.7	<1	
B (Treatment)	3	2.4	<1	
AB	6	6.1	<1	

Test of Equality of Regression Coefficients

Within	51	9.7		
Regression	11	11.9	1.23	

Note. - Pre-test = covariate. Post-test = variate

Note. - Correlation of age with
pre-test = 0.47 P .
post-test = 0.48 P .
(d.f. =73)

Table 56.

Analysis of Covariance for the Variable

Standing Broad Jump

SOURCE	*df*	*MS*	*F*	*P<*
Within	62	39.2		
Regression	1	3703.6	94.47	.001
A (Diagnosis)	2	47.1	1.20	
B (Treatment)	3	29.6	<1	
AB	6	22.5	<1	

Test of Equality of Regression Coefficients

Within	51	35.2		
Regression	11	57.8	1.64	

Note. - Pre-test = covariate. Post-test = variate

Note. - Correlation of age with
pre-test = 0.30 *P* .
post-test = 0.36 *P* .
(d.f. =73)

Table 57.

Analysis of Covariance for the Variable

Volley Ball Serve

SOURCE	*df*	*MS*	*F*	*P <*
Within	62	24.0		
Regression	1	424.5	17.69	.001
A (Diagnosis)	2	24.9	1.04	
B (Treatment)	3	22.8	<1	
AB	6	10.5	<1	
Test of Equality of Regression Coefficients				
Within	51	23.2		
Regression	11	27.9	1.20	

Note. - Pre-test = covariate. Post-test = variate

Note. - Correlation of age with
pre-test = 0.40 *P* .
post-test = 0.38 *P* .
(d.f. =73)

Table 58.

Analysis of Covariance for the Variable

Volley Ball Volley

SOURCE	*df*	*MS*	*F*	*P<*
Within	62	5.2		
Regression	1	25.3	4.87	.03
A (Diagnosis)	2	22.8	4.38	.02
B (Treatment)	3	14.3	2.76	.05
AB	6	12.8	2.47	.04
Test of Equality of Regression Coefficients				
Within	51	5.8		
Regression	11	2.2	<1	

Note. - Pre-test = covariate Post-test = variate

Note. - Correlation of age with
pre-test = 0.28 *P* .
post-test = 0.41 *P* .
(d.f. =73 *)*

Figure 15.

Treatment Means Plotted
for the Diagnostic Groups-

on the Variable

Volley Ball Volley

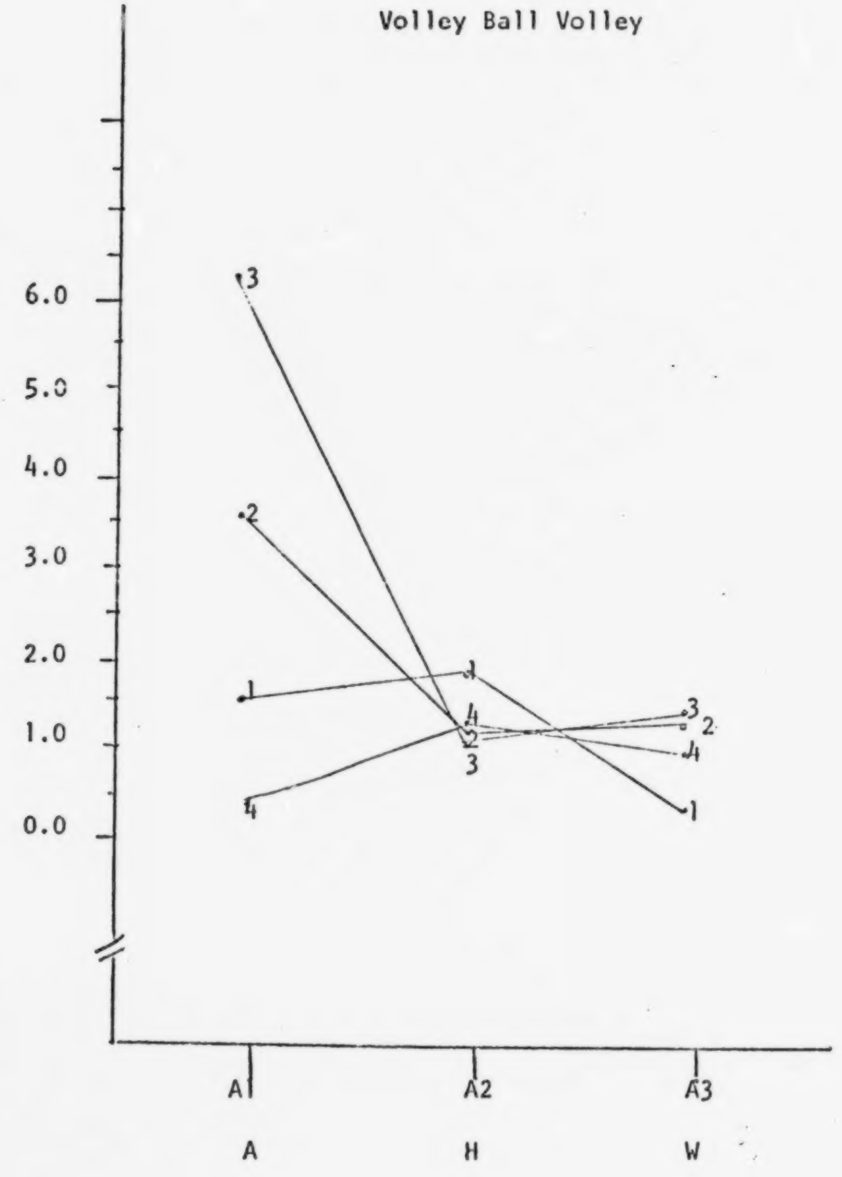


Table 59.

Analysis of Covariance for the Variable

30 Yard Dash

SOURCE	*df*	*MS*	*F*	*P<*
Within	62	1.0		
Regression	1	16.0	16.11	.001
A (Diagnosis)	2	6.0	6.05	.004
B (Treatment)	3	1.6	1.56	
AB	6	0.9	<1	
Test of Equality of Regression Coefficients				
Within	51	0.6		
Regression	11	2.8	4.62	.001

Note. - Pre-test = covariate. Post-test = variate

Note. - Correlation of age with
pre-test = 0.13 P .
post-test = 0.04 P .
(d.f. =73)

Table 60.

Analysis of Covariance for the Variable

Back Lift

SOURCE	*df*	*MS*	*F*	*P<*
Within	62	3020.8		
Regression	1	4580.9	1.52	
A (Diagnosis)	2	3968.1	1.31	
B (Treatment)	3	3755.7	1.24	
AB	6	832.9	<1	
Test of Equality of Regression Coefficients				
Within	51	2601.6		
Regression	11	4964.3	1.91	

Note. - Pre-test = covariate. Post-test = variate

Note. - Correlation of age with
pre-test = 0.26 *P* .
post-test = 0.49 *P* .
(d.f. =73)

Table 61.

Analysis of Covariance
for the Variable

Left Grip

SOURCE	*df*	*MS*	*F*	*P<*
Within	62	204.9		
Regression	1	1311.2	6.40	.02
A (Diagnosis)	2	238.2	1.16	
B (Treatment)	3	205.3	1.00	
AB	6	238.1	1.16	

Test of Equality of Regression Coefficients

Within	51	112.2		
Regression	11	635.1	5.66	.001

Note. - Pre-test = covariate. Post-test = variate

Note. - Correlation of age with
pre-test = 0.53 *P* .
post-test = 0.16 *P* .
(d.f. =73*)*

Table 62.

Analysis of Covariance for the Variable

Leg Lift

SOURCE	*df*	*MS*	*F*	*P<*
Within	62	3285.2		
Regression	1	27108.4	8.25	.006
A (Diagnosis)	2	637.4	<1	
B (Treatment)	3	6191.2	1.88	
AB	6	1461.4	<1	
Test of Equality of Regression Coefficients				
Within	51	2664.1		
Regression	11	6164.8	2.31	.03

Note. - Pre-test = covariate. Post-test = variate

Note. - Correlation of age with
pre-test = 0.20 P .
post-test = 0.16 P .
(d.f. =73)

Table 63.

Analysis of Covariance
for the Variable

Right Grip

SOURCE	*df*	*MS*	*F*	*P<*
Within	62	181.4		
Regression	1	832.5	4.59	.04
A (Diagnosis)	2	346.2	1.91	
B (Treatment)	3	276.6	1.52	
AB	6	231.8	1.28	

Test of Equality of Regression Coefficients

Within	51	129.3		
Regression	11	422.8	3.27	.002

Note. - Pre-test = covariate. Post-test = variate

Note. - Correlation of age with
pre-test = 0.62 P .
post-test = 0.48 P .
(d.f. =73)

Table 64.

Analysis of Covariance for the Variable

Strength Index

SOURCE	*df*	*MS*	*F*	*P<*
Within	62	23848.9		
Regression	1	8282.1	<1	
A (Diagnosis)	2	26590.5	1.12	
B (Treatment)	3	32576.0	1.37	
AB	6	9679.0	<1	
Test of Equality of Regression Coefficients				
Within	51	12302.2		
Regression	11	77383.6	6.29	.001

Note. - Pre-test = covariate. Post-test = variate

Note. - Correlation of age with
pre-test = 0.48 *P* .
post-test = 0.04 *P* .
(*d.f.* =73)

Table 65.

Analysis of Covariance
for the Variable

Normal Strength Index

SOURCE	*df*	*MS*	*F*	*P <*
Within	62	66879.9		
Regression	1	498658.3	7.46	.008
A (Diagnosis)	2	79287.5	1.19	
B (Treatment)	3	30685.7	<1	
AB	6	46807.3	<1	
Test of Equality of Regression Coefficients				
Within	51	29928.9		
Regression	11	238198.2	7.96	.001

Note. - Pre-test = covariate. Post-test = variate

Note. - Correlation of age with
pre-test = 0.63 P .
post-test = 0.34 P .
(d.f. =73)

Table 66.

Analysis of Covariance
for the Variable

Physical Fitness Index

SOURCE	*df*	*MS*	*F*	*P <*
Within	61	266.4		
Regression	1	216.7	<1	
A (Diagnosis)	2	626.9	2.35	
B (Treatment)	3	267.9	1.01	
AB	6	76.8	<1	
Test of Equality of Regression Coefficients				
Within	50	233.3		
Regression	11	416.9	1.79	

Note. - Pre-test = covariate. Post-test = variate

Note. - Correlation of age with
pre-test = 0.06 P .
post-test = 0.42 P .
(d.f. =72)

Table 67.

Analysis of Covariance for the Variable

Multiplier

SOURCE	*df*	*MS*	*F*	*P<*
Within	62	3.2		
Regression	1	570.1	180.43	.001
A (Diagnosis)	2	0.8	<1	
B (Treatment)	3	1.5	<1	
AB	6	5.7	1.79	

Test of Equality of Regression Coefficients

Within	51	2.6		
Regression	11	5.8	2.24	.03

Note. - Pre-test = covariate. Post-test = variate

Note. - Correlation of age with
pre-test = 0.70 P .
post-test = 0.66 P .
(d.f. =73)

Table 68.

Analysis of Covariance
for the Variable

WISC - Information

SOURCE	df	MS	F	P<
Within	61	2.5		
Regression	1	180.7	71.37	.001
A (Diagnosis)	2	2.0	<1	
B (Treatment)	3	3.4	1.35	
AB	6	2.8	1.12	
Test of Equality of Regression Coefficients				
Within	50	2.0		
Regression	11	5.2	2.65	.009

Note. - Pre-test = covariate. Post-test = variate

Note. - Correlation of age with
pre-test = 0. P .
post-test = 0. P .
(d.f. =)

Table 69.

Analysis of Covariance for the Variable

WISC - Comprehension

SOURCE	*df*	*MS*	*F*	*P<*
Within		4.4		
Regression		86.5	19.47	.001
A (Diagnosis)		8.8	1.98	
B (Treatment)		0.7	<1	
AB		3.8	<1	
Test of Equality of Regression Coefficients				
Within		4.5		
Regression		4.0	1	

Note. - Pre-test = covariate. Post-test = variate

Note. - Correlation of age with
pre-test = 0. P .
post-test = 0. P .
(d.f. =)

Table 70.

Analysis of Covariance for the Variable

WISC - Arithmetic

SOURCE	df	MS	F	P <
Within	61	4.7		
Regression	1	177.8	37.54	.001
A (Diagnosis)	2	2.8	<1	
B (Treatment)	3	5.9	1.25	
AB	6	2.9	<1	
Test of Equality of Regression Coefficients				
Within	50	4.4		
Regression	11	6.1	1.38	

Note. - Pre-test = covariate. Post-test = variate

Note. - Correlation of age with
pre-test = 0. P .
post-test = 0. P .
(d.f. =)

Table 71.

Analysis of Covariance for the Variable

WISC - Similarities

SOURCE	*df*	*MS*	*F*	*P<*
Within		5.8		
Regression		156.9	27.13	.001
A (Diagnosis)		7.8	1.35	
B (Treatment)		4.6	<1	
AB		9.9	1.71	
Test of Equality of Regression Coefficients				
Within		6.7		
Regression		1.8	<1	

Note. - Pre-test = covariate. Post-test = variate

Note. - Correlation of age with
pre-test = 0. *P* .
post-test = 0. *P* .
(d.f. =)

Table 72.

Analysis of Covariance for the Variable

WISC - Vocabulary

SOURCE	*df*	*MS*	*F*	*P<*
Within	61	4.9		
Regression	1	157.2	32.02	.001
A (Diagnosis)	2	26.6	5.42	.007
B (Treatment)	3	8.3	1.69	
AB	6	4.2	<1	
Test of Equality of Regression Coefficients				
Within	50	5.1		
Regression	11	4.0	<1	

Note. - Pre-test = covariate. Post-test = variate

Note. - Correlation of age with
pre-test = 0. P .
post-test = 0. P .
(d.f. =)

Table 73.

Analysis of Covariance
for the Variable

WISC - Picture Completion

SOURCE	df	MS	F	P<
Within	61	6.7		
Regression	1	98.4	14.70	.001
A (Diagnosis)	2	6.9	1.02	
B (Treatment)	3	3.9	<1	
AB	6	11.7	1.75	
Test of Equality of Regression Coefficients				
Within	50	5.1		
Regression	11	14.0	2.75	.007

Note. - Pre-test = covariate. Post-test = variate

Note. - Correlation of age with
pre-test = 0. P .
post-test = 0. P .
(d.f. =)

Table 74.

Analysis of Covariance for the Variable

WISC - Picture Arrangement

SOURCE	*df*	*MS*	*F*	*P<*
Within	61	7.3		
Regression	1	104.0	14.26	.001
A (Diagnosis)	2	12.5	1.71	
B (Treatment)	3	1.7	<1	
AB	6	3/2	<1	

Test of Equality of Regression Coefficients

Within	50	6.8		
Regression	11	9.6	1.42	

Note. - Pre-test = covariate. Post-test = variate

Note. - Correlation of age with
pre-test = 0. P .
post-test = 0. P .
(d.f. =)

Table 75.

Analysis of Covariance
for the Variable

WISC - Block Design

SOURCE	*df*	*MS*	*F*	*P<*
Within	61	4.2		
Regression	1	428.5	102.20	.001
A (Diagnosis)	2	4.6	1.09	
B (Treatment)	3	6.5	1.55	
AB	6	13.8	3.29	.007

Test of Equality of Regression Coefficients

Within	50	4.6		
Regression	11	2.2	<1	

Note. - Pre-test = covariate. Post-test = variate

Note. - Correlation of age with
pre-test = 0. *P* .
post-test = 0. *P* .
(d.f. =)

Table 76.

Analysis of Covariance for the Variable

WISC - Object Assembly

SOURCE	*df*	*MS*	*F*	*P* <
Within	56	6.8		
Regression	1	130.7	19.18	.001
A (Diagnosis)	2	17.6	2.59	
B (Treatment)	3	1.8	<1	
AB	6	8.1	1.19	
Test of Equality of Regression Coefficients				
Within	45	5.4		
Regression	11	12.6	2.32	.02

Note. - Pre-test = covariate. Post-test = variate

Note. - Correlation of age with
pre-test = 0. *P* .
post-test = 0. *P* .
(d.f. =)

Table 77.

Analysis of Covariance for the Variable

WISC - Coding

SOURCE	*df*	*MS*	*F*	*P <*
Within	59	5.6		
Regression	1	166.6	29.96	.001
A (Diagnosis)	2	2.1	<1	
B (Treatment)	3	0.7	<1	
AB	6	10.2	1.84	
Test of Equality of Regression Coefficients				
Within	48	5.9		
Regression	11	4.1	1	

Note. - Pre-test = covariate. Post-test = variate

Note. - Correlation of age with
pre-test = 0. *P* .
post-test = 0. *P* .
(d.f. =)

Table 78.

Analysis of Covariance for the Variable

WISC - Verbal IQ

SOURCE	*df*	*MS*	*F*	*P<*
Within	61	60.1		
Regression	1	4516.6	75.14	.001
A (Diagnosis)	2	76.0	1.26	
B (Treatment)	3	40.9	<1	
AB	6	26.7	<1	
Test of Equality of Regression Coefficients				
Within	50	66.3		
Regression	11	32.0	<1	

Note. - Pre-test = covariate. Post-test = variate

Note. - Correlation of age with
pre-test = 0. P .
post-test = 0. P .
(d.f. =)

Table 79.

Analysis of Covariance for the Variable

WISC - Performance IQ

SOURCE	df	MS	F	P<
Within	61	77.3		
Regression	1	7589.6	98.19	.001
A (Diagnosis)	2	149.5	1.93	
B (Treatment)	3	28.3	<1	
AB	6	236.1	3.08	.02
Test of Equality of Regression Coefficients				
Within	50	66.5		
Regression	11	126.3	1.90	

Note. - Pre-test = covariate. Post-test = variate

Note. - Correlation of age with
pre-test = 0. P .
post-test = 0. P .
(d.f. =)

Table 80.

Analysis of Covariance for the Variable

WISC - Full Scale IQ

SOURCE	*df*	*MS*	*F*	*P<*
Within	61	52.8		
Regression	1	6046.6	114.58	.001
A (Diagnosis)	2	113.1	2.14	
B (Treatment)	3	44.9	<1	
AB	6	88.1	1.67	
Test of Equality of Regression Coefficients				
Within	50	54.0		
Regression	11	47.0	1	

Note. - Pre-test = covariate. Post-test = variate

Note. - Correlation of age with
pre-test = 0. P .
post-test = 0. P .
(d.f. =)

Table 81.

Analysis of Covariance for the Variable

ITPA - Auditory Reception

SOURCE	*df*	*MS*	*F*	*P<*
Within	62	72.3		
Regression	1	157.9	2.18	
A (Diagnosis)	2	175.0	2.42	
B (Treatment)	3	78.8	1.09	
AB	6	16.5	1	

Test of Equality of Regression Coefficients				
Within	51	78.5		
Regression	11	43.6	<1	

Note. - Pre-test = covariate. Post-test = variate

Note. - Correlation of age with
pre-test = 0. P .
post-test = 0. P .
(d.f. =)

Table 82.

Analysis of Covariance for the Variable

ITPA - Visual Reception

SOURCE	*df*	*MS*	*F*	*P<*
Within	62	66.9		
Regression	1	4.0	<1	
A (Diagnosis)	2	423.8	6.33	.003
B (Treatment)	3	160.4	2.40	
AB	6	76.1	1.14	
Test of Equality of Regression Coefficients				
Within	51	66.3		
Regression	11	69.9	1.06	

Note. - Pre-test = covariate Post-test = variate

Note. - Correlation of age with
pre-test = 0. P .
post-test = 0. P .
(d.f. =)

Table 83.

Analysis of Covariance for the Variable

ITPA - Auditory Association

SOURCE	df	MS	F	P<
Within	62	69.8		
Regression	1	13.5	<1	
A (Diagnosis)	2	460.6	6.60	.003
B (Treatment)	3	105.4	1.51	
AB	6	85.1	1.22	
Test of Equality of Regression Coefficients				
Within	51	64.8		
Regression	11	92.8	1.43	

Note. - Pre-test = covariate. Post-test = variate

Note. - Correlation of age with
pre-test = 0. P .
post-test = 0. P .
(d.f. =)

Table 84.

Analysis of Covariance
for the Variable

ITPA - Visual Association

SOURCE	*df*	*MS*	*F*	*P<*
Within	62	36.9		
Regression	1	132.5	3.59	
A (Diagnosis)	2	40.9	1.11	
B (Treatment)	3	61.1	1.66	
AB	6	168.9	4.58	.001
Test of Equality of Regression Coefficients				
Within	51	35.7		
Regression	11	42.3	1.18	

Note. - Pre-test = covariate. Post-test = variate

Note. - Correlation of age with
pre-test = 0. P .
post-test = 0. P .
(d.f. =)

Figure 16.

Adjusted Treatment Means Plotted
for the Diagnostic Groups-

on the Variable

ITPA - Visual Association

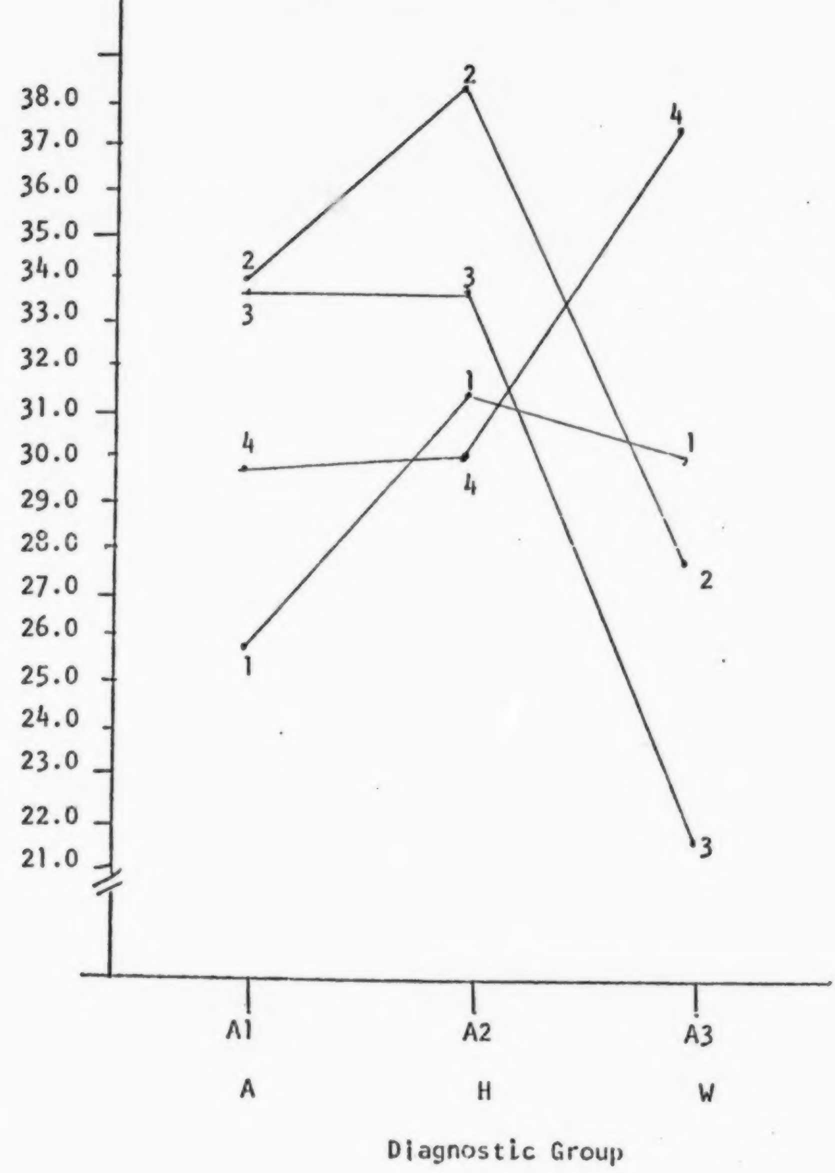


Table 85.

Analysis of Covariance for the Variable

ITPA - Verbal Expression

SOURCE	*df*	*MS*	*F*	*P<*
Within	62	17.6		
Regression	1	1.2	<1	
A (Diagnosis)	2	43.8	2.49	
B (Treatment)	3	15.5	<1	
AB	6	16.8	<1	
Test of Equality of Regression Coefficients				
Within	51	18.3		
Regression	11	14.1	<1	

Note. - Pre-test = covariate. Post-test = variate

Note. - Correlation of age with
pre-test = 0. P .
post-test = 0. P .
(d.f. =)

Table 86.

Analysis of Covariance
for the Variable

ITPA - Manual Expression

SOURCE	*df*	*MS*	*F*	*P<*
Within	62	32.7		
Regression	1	2.1	<1	
A (Diagnosis)	2	320.5	9.81	.001
B (Treatment)	3	38.7	1.18	
AB	6	18.1	<1	

Test of Equality of Regression Coefficients

Within	51	22.9		
Regression	11	77.9	3.40	.001

Note. - Pre-test = covariate. Post-test = variate

Note. - Correlation of age with
pre-test = 0. *P* .
post-test = 0. *P* .
(d.f. =)

Table 87.

Analysis of Covariance for the Variable

ITPA - Visual Closure

SOURCE	df	MS	F	P<
Within	62	52.2		
Regression	1	60.1	1.15	
A (Diagnosis)	2	453.6	8.70	.001
B (Treatment)	3	30.0	<1	
AB	6	104.2	2.00	

Test of Equality of Regression Coefficients

Within	51	53.7		
Regression	11	44.8	<1	

Note. - Pre-test = covariate. Post-test = variate

Note. - Correlation of age with
pre-test = 0. P .
post-test = 0. P .
(d.f. =)

Table 88.

Analysis of Covariance for the Variable

ITPA - Grammatical Closure

SOURCE	*df*	*MS*	*F*	*P<*
Within	62	107.4		
Regression	1	152.9	1.42	
A (Diagnosis)	2	42.5	<1	
B (Treatment)	3	164.1	1.53	
AB	6	130.1	1.21	
Test of Equality of Regression Coefficients				
Within	51	95.3		
Regression	11	163.9	1.72	

Note. - Pre-test = covariate. Post-test = variate

Note. - Correlation of age with
pre-test = 0. *P* .
post-test = 0. *P* .
(d.f. =)

Table 89.

Analysis of Covariance
for the Variable

ITPA - Auditory Memory

SOURCE	*df*	*MS*	*F*	*P<*
Within	62	40.3		
Regression	1	32.8	<1	
A (Diagnosis)	2	18.7	<1	
B (Treatment)	3	2.0	<1	
AB	6	41.3	1.02	
Test of Equality of Regression Coefficients				
Within	51	40.9		
Regression	11	37.5	<1	

Note. - Pre-test = covariate. Post-test = variate

Note. - Correlation of age with
pre-test = 0.   P .
post-test = 0.   P .
(d.f. =)

Table 90.

Analysis of Covariance
for the Variable

ITPA - Visual Memory

SOURCE	*df*	*MS*	*F*	*P<*
Within	62	51.8		
Regression	1	7.7	<1	
A (Diagnosis)	2	203.1	3.92	.03
B (Treatment)	3	35.6	<1	
AB	6	38.7	<1	

Test of Equality of Regression Coefficients

Within	51	42.5		
Regression	11	95.1	2.24	.03

Note. - Pre-test = covariate. Post-test = variate

Note. - Correlation of age with
pre-test = 0. *P* .
post-test = 0. *P* .
(d.f. =)

Table 91.

Three-factor Analysis of Variance with One Repeated Measure Criterion =

Bender-Gestalt Error Scores

SOURCE	df	MS	F	P≤
Between	80			
C (Diagnosis)	2	47.3	1.97	
B (Treatment)	3	13.8	<1	
BC	6	15.3	<1	
error (between)	69	24.5		
Within	162			
A (Pre-Post1-Post2)	2	32.1	11.94	.001
AC	4	1.6	<1	
AB	6	1.1	<1	
ABC	12	3.6	1.33	
error (within)	138	2.7		

Note. - Repeated measurements were taken before (Pre) immediately after (Post1) and approximately eight months after treatment (Post2).

SECTION III
SECOND YEAR DATA ANALYSES
(SUMMER, 1971)

METHODOLOGY

GENERAL STATEMENT

The project objectives remained unchanged during the second year of operation. Data collected during the summer of 1971 fulfilled the primary intent of the project which was to establish a comprehensive data bank composed of physical, perceptual, cognitive, affective, behavioral, academic and social correlates of physical performance for emotionally-disturbed, male, public school children. Once again, a comparison of three types of physical training was planned to determine the differential effects of training for three types of emotionally disturbed children. Children identified as 'Aggressive', 'Hyperactive' and 'Withdrawn' were assigned to one of four experimental groups described as Physical Training, General Coordination, Specific Coordination and Control.

Selection of Subjects

The population from which the subjects were drawn was defined by male students enrolled in special classes for emotionally disturbed in Montgomery County (Pennsylvania) Schools during the Spring of 1971. This population was restricted on the basis of four variables. All subjects eligible for participation in the project had to be male, between the ages cf 8 and 14, free from any serious physical handicaps, and available to participate in an eight week continuous summer program. Family activities were the primary determinent of the child's ability to participate in the program. Due to the educational programming of the subject population all perspective participants had been previously evaluated by a qualified district psychologist. Availability of this data was used by project staff in order to identify subjects as being in one of three general psychiatric diagnostic categories. These categories have been previously described as Aggressive, Hyperactive and Withdrawn. Hereafter these categories may be referred to as A, H and W respectively.

Given the above restrictions on the subject population approximately 96 boys were identified as an appropriate subject pool. Assignment of subjects was based on a stratified random design. Within each diagnostic category subjects were listed alphabetically and numbered sequentially. Random assignment was then achieved using the Rand Test of Random Digits.

The assignment was made to one of the four treatment conditions identified above. The 3 treatment conditions of Physical Training, General Coordination and Specific Coordination all involved concentrated daily physical activity. The differences in these groups were in what activities were emphasized rather than in the degree of involvement. The fourth treatment condition was a control group involving no directed physical activities.

Within each diagnostic category sampling was continued beyond the predetermined sample size in order to identify alternates who could be used should it be necessary for original subjects to withdraw from the study. Although it may be noted that the same subject selection procedures were used during both years of the project, those subjects participating in the first year of the project were not represented in the second year of the study.

This section of the final report is organized with the tables included in separate appendices rather than having them interspersed in the narrative. Use of this final manuscript format was adopted in order to maintain the continuity of the narrative. Within the narrative, reference will be made to appropriate tables and appendices. The narrative is concerned with discussion of statistical analyses of data appropriate to each of four subdivisions in which testing was accomplished. These four areas are:

1. Achievement
2. Behavior
3. Learning Aptitude
4. Physical Performance

Analyses of data gathered during the second year of the program reflected techniques different from those used in the first year of the project. Reasons for these changes and a complete description of procedures used are presented in the following section.

Statistical Analyses

(Summary tables appropriate to the following discussion of analyses can be found in Appendix G of this report.)

Achievement in School. As in the previous operational year, two common measures of elementary school achievement were used to assess any effects that the training regimen may have had on these criteria. The tests used were the Stanford Achievement Test (SAT) and the Wide Range Achievement Test (WRAT). The testing design called for data collection on a pretest, posttest 1, posttest 2 basis. The experimental design included a repeated measures factor as one means of helping to control for initial differences on the criterion. However, based on experiences and information gained during the first year of the study, it was determined that a covariance model represented a superior technique for equating treatment groups on tested variables. In the concluding narrative of Section II it was proposed that such a covariance approach should be employed for analysis of second year data. The statistical reasoning for this decision is based upon the Cronbach & Furby (1970) article dealing with the issue of covariance versus gain score methodology. It has been noted that the statistical benefits expected from random selection procedures were not evident in a post hoc examination of first year data. Due to the procedures employed the assumptions of random assignment were met in obtaining second year data. Given this situation Cronbach and Furby recommend covariance analyses using the pretest as the covariate for making adjustments in deference to any type of gain score methodology. In implementing these recommendations the Multivariate Analysis of Variance and Covariance Program of Clyde Computing Service, Miami, Florida were used in analyzing the data. Pretests for the two achievement measures noted above served as covariates to posttest 1 scores on the appropriate measures. The effect of this procedure is to control for initial group achievement differences measured by the SAT and WRAT instruments prior to experimental intervention. This design involves the factors of treatments (4 levels) and diagnostic groups (3 levels). The results of these analyses are presented as Tables 1 through 10 in Appendix G.

From the SAT, grade equivalent scores were derived for three subtests: Arithmetic Computation, Word Meaning and Paragraph Meaning. As can be seen in Table 1 no significant differences were evident for either the Diagnostic Group or treatment factor. The treatment by Diagnostic Group interaction was significant ($p < .05$). The nature of this interaction can best be seen from the graph in Figure 1. Mean SAT Arithmetic Computation score differences between treatment groups across diagnostic categories indicates evidence of a disordinal interaction. However, no specific trends can be seen. Again a significant interaction factor is the only significant factor when SAT Word Meaning is taken as the dependent variable ($p < .05$). A graphical presentation of this interaction appears in Figure 2. No significant effects, for main or interaction factors, were forthcoming with SAT Paragraph Meaning as the dependent variable.

From the WRAT, grade equivalent scores were derived for two subtests: Reading and Arithmetic. For the WRAT reading variable both main effects were found to be significant. For the treatment factor the p level was less than .05 and for the diagnostic group factor p was less than .01. In order to interpret these significant main effects the reader is referred to Table 7. The adjusted criterion means for treatment groups across all diagnostic groups shows a difference of approximately two points between the lowest (control) and highest (general) group means. Looking at the adjusted criterion means for the three diagnostic groups across all treatments it can be seen that the difference between the lowest (W) and highest (A) category is less than one point. It must be kept in mind that these differences are reported in grade equivalent score units and therefore differences in reading achievement as measured by the WRAT are considerable in both cases. The lack of significance of the interaction factor results in a clearer intrepretation of the significant main effects. As was the case with SAT Arithmetic Computation, only a significant interaction (DGXT) was uncovered when the dependent variable was WRAT Arithmetic. This interaction factor was significant at a p level of less than .05. Although a disordinal interaction exists, interpretation is difficult. It is interesting to note the marked degree of similarity in the graphs presented in Figure 1 (SAT Arithmetic) and Figure 3 (WRAT Arithmetic). Since Figures 1 and 3 are based on independent measures of arithmetic achievement, the factor level patterns evidenced in both interactions were highly reliable.

The repeated appearance of significant interaction effects are, perhaps, of greatest overall interest. Disordinal interactions of the type found with these achievement variables could be interpreted within the rubric of aptitude-treatment interactions. These findings are consistent with analysis of first year data and results. As was indicated previously, this would indicate the possibility of particular physical training treatments being more appropriate for a different diagnostic group.

Behavior

Use was made of two behavior rating scales in order to determine the effects of the physical training treatment differences on subsequent behavior in the classroom. The first scale employed was the Devereux Elementary School Behavior Rating Scale (DEV), an instrument which yields 11 factor scores purported to measure various ratings of classroom behavior. The second instrument used was the Quay Behavior Checklist. Data resulting from this scale also reflects several aspects of behavior in the classroom as well as general observations about children's social and personal behavior. These scales are identical to the scales used in the first operational year. Although the same instruments were used to collect the data for the behavioral area, the analyses were not identical to those in the first year. In the analysis of the first year data, it can be seen that a diagnostic group was considered a main factor. However, based on a critical examination of the first year's results and analysis technique, it was felt that it was more appropriate to delete the Diagnostic factor from the analysis design for the behavioral data. This decision was based on the judgment that measures of personality are so closely related to the blocking variable of diagnostic group, covarying on diagnostic pretest information would render as meaningless both the diagnostic group (DG) factor and interaction between treatment and DG. There will be separate ANCOVA analyses consisting of the following: 11 Devereux subscales, 2 Bender derived scores, and 4 Quay subscales. These analyses were conducted using one way ANCOVA programs of the Clyde Computing Service, Miami, Florida. Using Quay Conduct for an example, the Quay pre-conduct scores were covaried upon the Quay post-conduct scores in order to examine differences among treatment means (the only factor) after controlling for initial pretreatment differences.

Presentation of results for the DEV Scales will be in three sections. The first of the DEV factor scores to reveal a significant effect ($p < .05$) was DEV Impatience. The significant overall treatment effect indicates that at least one adjusted treatment mean significantly differs from another. Inspection of the means in Table 13 show that the rank order from high to low was control, specific coordination, Physical Training and General Coordination with more than a 3.1 point spread between the two extreme treatment groups. This would seem to indicate that the Control Group was generally rated higher on the Impatience factor than were other treatment groups. The second DEV factor displaying a significant treatment effect was DEV-Achievement Anxiety ($p < .05$). The rank ordering from high to low of treatment means was Control, Physical Training, General Coordination and Specific Coordination as can be seen in Table 19. The range of 3.5 points between high and low treatment means was substantial and similar to the range found for the DEV-Impatience factor. Again some type of physical education intervention would appear to have produced lower scores on this factor. The Control Group was the only experimental group which demonstrated an increase between the pre and post testing. In a highly controlled experimental study it would not be legitimate to discuss results which exceeded a pre-established significance or alpha level. However, in field research which is not conducted in a highly controlled laboratory setting, it is desirable to note statistical results which approach conservative alpha significance levels. The reasons for this recommendation are twofold: One to avoid the possibility of saying there was no difference between groups (when in fact there was one) i.e. increasing the power of the test, and two to suggest directions for future research. Two DEV factors resulted in a significance level which makes them worthy of noting on the basis of the previous discussion.

The DEV-Disrespect Defiance factor has a treatment significance level of 0.075. In Table 15 it is shown that two of the treatment groups (Control and Physical Training) were rated higher on this factor following treatment while the other two groups (Specific and General Coordination) had lower mean scores after treatment. On the pretest the Physical Training group had a mean score of 9.417 and a post-test unadjusted mean of 11.708, an increase of more than 2 points. This increase represents a change in rank order from lowest on the pretest to highest on the posttest. The second DEV factor which approached the pre established alpha level of .05 was the DEV-Creative-Initiative ($p < .055$). From Table 29 it can be seen that the Control Group demonstrated a noticeable increase; while the three experimental groups had only minor fluctuations in mean score between pre and post testing. It can be seen from this Table that this increase had the Control Group displaying a higher mean score on this factor than did the three treatment groups. For the remaining seven DEV factors no statistically significant main effect was present. However, the group means and summary ANCOVA data are presented in Tables 11 through 32.

Presentation of the Quay results is seen in Tables 33 through 40. Inspection of these ANCOVA summary tables indicate that none of the four Quay subscales produced a significant treatment main effect. This result can be explained by looking at the tables of treatment means. There is minimal variability among the four treatment means for all 4 of the Quay variables. It would appear that the three treatment conditions had no differential effects on the four behavioral variables measured by the Quay Scale.

Although four of eleven Devereaux factors resulted in significant differences between treatment groups, no consistent pattern of significant findings exist between first and second year data. Results are similarly inconclusive for data derived from the Quay Behavior Checklist. As was noted in the discussion of first year data (Chapter II), analysis of Quay Personality scale scores resulted in significant treatment differences, an effect which was not supported by second year findings.

The final instrument to be discussed was the Bender-Gestalt for Young Children. Both Age Scores and Error scores were derived from this measure. Using an ANCOVA technique with one factor (Treatments) a significant effect was not found when Error Scores were used as the criterion. In the report of findings of 1970 data it was noted that although Error Scores were found to be significant for Treatment, the effects of maturation (nine months between testing) could have produced this result. The fact that for second year data a shorter time lapsed between test sessions and no significance resulted may support this position. Significant differences between treatment groups was found when Age Scores were used as the dependent measure. Means and summaries of this analysis are presented in Tables 41 through 44 of Appendix G.

Physical Performance

The 1970 physical performance test included 37 measures of performance believed to measure performance in 14 categories. This organization of the named test items into the categories listed is somewhat a judgmental matter. There have been factor analysis studies and judgments of experts which support this organization but the results and the opinions are conflicting. Additionally, the factor analysis studies dealt with tests administered to "normal" children. It was believed that a factor analysis of the scores from the test items used in the present investigation should provide valuable information about the dimensions of physical performance and the most appropriate test items to use for each factor when working with emotionally handicapped children. The factor analysis of these data should enable us to recommend a much briefer battery of physical performance tests without sacrificing information regarding the child's ability. After the 1970 testing program was completed a factor analysis was performed on the data to make comparisons to the original hypothesized factorial structure. The original hypothesized structure and that which was actually found is shown as appendix D. The comparison indicates that, although there is some agreement between the hypothesized factor being measured by each test item and that which was found in the present investigation, there are some very noticeable disagreements. The discrepancies appear to be explainable only by forming a hypothesis of a physical performance factorial structure different than that previously set forth in physical education. Further study is needed to clarify and test the hypothesis but roughly indicated it would appear as follows.

Each person has a degree of mental awareness and control of each muscle group. When a person has a high degree of awareness and control of a specific muscle group he can perform successfully many tests involving that joint and muscle group regardless of whether strength, flexibility, or endurance is required. Therefore, an anatomical factorial design related to mental perception appears to explain the factors better than the usual structure. This hypothesis relates to that studied by Edwin Fleishman but takes a different direction in that mental perception is considered. Extensive further study is needed to determine if the hypothesis is true for emotionally handicapped children and subsequently whether it might also be true for "normal" individuals.

Investigation of the hypothesis is vital to further programming of physical education for emotionally handicapped children. If the hypothesis is true, the focus of programming should be based on mental perception and control of muscle groups rather than primarily on such factors as agility, endurance, etc. Programming based on the incorrect hypothesis would result in only sporadic and unpredictable changes.

In reporting first year results each of the 34 test items were analyzed separately as can be seen in Tables 31 through 63 in Appendix F. The reliability of such single item tests would be highly questionable, however, throughout all such analyses. Based on this consideration 3 composites of strength, endurance and coordination were generated from 30 of the 34 physical performance test items administered during the first year. The composites are as follows:

Strength

(a) throw and catch
(b) left grip
(c) right grip
(d) lung capacity
(e) modified Harvard step test
(f) cable jump (5 forward)
(g) extent flexibility
(h) cable jump (10)
(i) back lift
(j) leg lift

Endurance

(a) flexed arm hang
(b) pull up
(c) push up
(d) arm strength
(e) tapered balance beam
(f) 300 yard dash
(g) standing broad jump
(h) 30 yard dash
(i) dynamic flexibility
(j) shuttle run
(k) balance A
(l) 600 yard run

Coordination

(a) kinesthesiometer
(b) ball throw
(c) shot put
(d) volleyball serve
(e) volleyball volley
(f) curl up
(g) zig zag run
(h) ball kick

These three composite areas of behavior were based upon a factor analytic study completed in 1970. The effectiveness of these tests in responding to the treatments themselves was presented as a research presentation at the 1972 National Convention of the American Association of Health, Physical Education and Recreation. The presentation is included as appendix C.

The composites and the number of measures they represent are: Strength -- ten (10) measures; Endurance -- twelve measures; and Coordination -- eight measures. Each composite is a linear combination of standard scores [mean of zero (0.00); standard deviation of ± 1.0] derived from each appropriate measure. Thus, each composite has a mean of zero (o.00) and a unique standard deviation and range.

The first composite to be considered is Strength. Means on this variable were analyzed using ANCOVA with pretest composite scores as the covariate. The results of this procedure can be seen in Summary Table 46 (Appendix G). Both the main effect of Treatment and Diagnostic Groups are significant ($p < .01$).

Since the Treatment X Diagnostic Group interaction is not significant at the predetermined alpha level ($p < .05$) interpretation of main effects is simplified. Looking at adjusted criterion means for treatments across all diagnostic categories (Table 45) it is noted that the control group has a mean of (-) 2.758 while the three groups receiving training had means ranging from (+) .023 to (+) 1.838. Differences among these groups allow rejection of the null hypothesis with $p < .001$. Diagnostic Group differences are evident in means of 1.482 (Aggressive), -0.477 (Hyperactive) and -1.004 (Withdrawn). In sum, Tables 45 and 46 indicate that Specific Coordination procedures develop greatest strength as a result of training while structured physical training of some sort results in greater strength than does the absence of such training. Further, Diagnostic Groups respond with various levels of strength regardless of treatment.

Similar group patterns emerge for the composite described as Endurance. Results of ANCOVA analysis can be seen in Table 48 with $p < .05$ as the established alpha level necessary for rejection of a hypothesis of no difference between groups. As in the case of Strength, we, again, find that the main effects of Diagnostic Groups ($P < .041$) and Treatment ($p < .001$) are significant while the interaction of these variables is not significant ($p < .429$). Examining the adjusted mean patterns presented in Table 47 the Control Group is considerably lower than those groups receiving structured physical activity. Among these three groups the mean rankings for Endurance are different than those for Strength indicating that the individual program emphases may provide distinct results. The Diagnostic Group pattern evidenced for the Endurance composite is identical to that for Strength with 'Aggressives' having the highest adjusted group mean and 'Withdrawns' the lowest.

This pattern for Diagnostic Groups is again present when the Coordination composite is taken as the dependent measure (as shown in Summary Table 50). The 'Aggressive' category appears to have benefited most from treatment, followed by 'Hyperactive' and finally the 'Withdrawn' category. In keeping with the previously discussed intent to consider differences approaching significance it should be noted that the main effect of Treatment had a p value of less than .081 (Table 50). The treatment adjusted means (Table 49) are seen to have a rank order different from that presented for either Strength or Endurance composites.

Two relationships are suggested by the data reported above. First, composite measures of physical variables result in higher group means for those subjects receiving a structured program of physical activity. The superiority of intervention group means over control group mean is independent of diagnostic category. Second, the benefits of physical activity are different for various diagnostic categories. Such differentials appear to be independent of the treatment condition, and consistant across physical measures taken.

Learning Aptitude

Two measures of learning aptitude were, again, administered during the second year of the grant. The instruments used were the Wechsler Intelligence Scale for Children (WISC) and the Illinois Test of Psycholinguistic Abilities (ITPA).

Following the procedure established during the first year of data collection, ten subtests of the WISC were administered before (Pretest) and immediately after (Posttest) the summer (1971) program. Statistically significant design effects were obtained for seven of the ten subtests. This represents a substantial increase over findings relating to first year data, for which only two of ten subtest analyses resulted in significant effects.

Summaries of group means and analyses are presented in Tables 51-76 of Appendix G. These include three sets of tables for the Performance, Verbal and Total Intelligence Quotients derived from the WISC subtests. The 13 significant subtest design effects are presented as follows.

A significant main effect for Diagnostic Group ($p < .050$) was found for the subtests of: Comprehension ($p < .012$); Object Assembly ($p < .010$); Similarities ($p < .041$); and Picture Arrangement ($p < .004$). A significant main effect for Treatment ($p < .050$) was found for the subtests of: Similarities ($p < .006$); Vocabulary ($p < .050$); and Information ($p < .044$). A significant interaction effect was found for the subtests of: Similarities (p .034); Picture Completion ($p < .040$); and Information ($p < .023$). These interactions indicate that treatment differences were not the same for the different diagnostic categories.

If there are conclusions to be drawn from the above analyses, it is perhaps best drawn from results of ANOVA with WISC I.Q. scores as the dependent measure. As was the case for first year data, WISC Performance IQ had a significant design effect. However, the significant effect involved interaction for 1970 data while a diagnostic Group main effect was found using 1971 data. This latter finding is consistent with the nature of subtests having significant diagnostic effects as reported above. The strength of these diagnostic group differences is also possibly reflected in a significant interaction effect (Treatment X Diagnostic Group) for WISC Total IQ. Since Total IQ is not independent of either Performance or Verbal IQ's it is possible to discuss the interaction in terms of Performance IQ diagnostic group differences and significant Treatment or Interaction effects for subtests heavily weighted on verbal factors, both of which are cited above.

The Performance IQ diagnostic group differences warrant further examination due to their possible determination of group differences when other than an intelligence instrument is used in obtaining the dependent measure. Can the diagnostic group differences on some measure (e.g. WRAT Reading) be accounted for by group differences on some measure of intelligence (e.g. WISC Total IQ)? An answer was sought through supplimentary analysis using multiple covariance with a focus on status differences inherent among the three diagnostic groups before the onset of treatments. [Results of the analysis are available upon request.] The five separate criteria were WRAT Reading, WRAT Arithmetic, SAT Paragraph Meaning, SAT Word Meaning, and SAT Arithmetic Computation. The three covariates were WISC Verbal IQ, WISC Performance IQ, and chronological age. An example of this technique would be WRAT Reading scores analyzed for only the factor of diagnostic groups and adjusted in multiple fashion by the three separate covariates. Results of this procedure indicate that initial group differences persist despite adjustment for the differences due to IQ and CA.

Learning aptitude was also measured through the administration of the ITPA subtests. As noted in Section II, the ITPA focuses on measurement of encoding and decoding skills as they apply to psycholinguistic abilities. The covariance analyses resulted in five significant design effects.

Diagnostic group differences were found for Visual Reception and Manual Expression subtests (ITPA Factors 2 and 6). In both cases the rank order (highest to lowest) of adjusted criterion means was Hyperactive, Aggressive, and Withdrawn. Group means and ANCOVA summaries can be seen in Tables 79 and 80 for Factor 2, and Tables 87 and 88 for Factor 6.

Treatment group differences were significant for Visual Association (Tables 83 and 84) and Visual Closure (Tables 91 and 92) subtests. No corresponding pattern of treatment group mean rank order was indicated for the two factors.

Only one subtest, Factor 9 - Auditory Memory, generated data resulting in an interaction effect between Treatments and Diagnostic Groups. The group means underlying this interaction maybe examined in Table 93 .

Summary

When dealing with emotionally disturbed children, one notices that two main classifications of such children (aggressive and hyperactive) exhibit a great deal of physical activity. The aggressives direct their actions toward others, while the hyperactive actions are non-person-oriented. While one might attempt to reduce these undesirable physical activities during the regular academic year, the usual daily academic frustrations encountered by these disturbed children might aggravate their conditions and thus vitiate any attempts to improve their emotional adjustment. Thus, the present study brought children to an 8-week summer camp setting. Attempts were made not to eliminate undesirable physical behavior as such but instead to redirect it into purposeful physical activities and at the same time improve their emotional adjustment.

The study involved 96 emotionally disturbed boys between the ages of 6 and 14. The children had been previously diagnosed by psychiatrists using the standard diagnostic and statistical manual of the American Psychiatric Association. On the basis of these detailed diagnoses, the children were classified at a more global level by the same psychiatrists into aggressive, hyperactive or withdrawn. Stratified randomization was used to form 4 groups of 24 _S_s each, with 8 aggressive, 8 hyperactive and 8 withdrawn _S_s in each group. The 4 groups were in turn randomly assigned to 4 treatments: (_a_) control, (_b_) physical fitness, (_c_) general coordination and (_d_) specific coordination. In this way, a controlled investigation was possible of the effects of different physical programming with different diagnostic groups.

The treatments were developed in a highly structured manner by experts in physical education motoric activities. Quite detailed training manuals were developed for the numerous activities. The procedures were field tested in a similar design setting with a different sample of children the summer prior to the present study's implementation. The physical fitness group received activities aimed at improving a child's strength, endurance, speed, flexibility, agility and power. The general coordination group received activities to improve a child's ability to maneuver his body in any desired manner. The specific coordination group provided a child with the skills necessary for successful performance in selected games.

With analysis of covariance (posttest adjusted by pretest) the study looked at three motoric areas (a 10-item strength test, a 12-item endurance test and an

8-item coordination test), 16 affective areas (the 11 subscales of the Devereux, the Bender-Gestalt Test and the 4 subscales of the Quay), two achievement areas (SAT and WRAT subscales), and two measures of learning aptitude (WISC and ITPA subscales). In the area of motor behavior, the specific coordination method was superior to the other two treatments and to the control group on the strength criterion. On the endurance criterion, both the specific and general programing approaches produced superior results. However, on the criterion of coordination, the control group demonstrated the best performance.

In the area of affective behavior, the specific coordination group exhibited superior performance using Bender developmental age scores. On the Devereux, the specific group had lowest achievement anxiety. However, the general coordination group excelled in having the least impatience. On any of the other Devereux scales, or on any of the Quay scales, no differences were found.

In the area of achievement (SAT and WRAT) significant Treatment X Diagnostic Group interactions were found for two subscales of the SAT and one of the WRAT. With arithmetic achievement as the dependent variable, evidence of an interaction (no main effects were significant) is consistent over both periods of treatment. While such an interaction was not present in analysis of WRAT reading data, both main effects were significant. Based on this data, the possibility of an aptitude-treatment interaction should be considered.

Two measures of learning aptitude were administered (WISC and ITPA) to subjects with Diagnostic Group differences reflected in WISC Performance IQ results. A Treatment by Diagnostic Group interaction was also found for WISC Total IQ scores. When ITPA scores are used as the measure of learning aptitude, Diagnostic Group differences were significant on subtests of Visual Reception and Manual Expression; Treatment differences were significant on subtests of Visual Association and Visual Closure; and a significant interaction effect resulted for the Auditory Memory subtest.

Thus, while specific attempts to restructure the physical activities of disturbed children did succeed in raising the quality of motoric behavior, the goal of improving emotional adjustment or altering aptitude showed inconclusive results. The results are discussed on the basis of theoretical and practical grounds.

APPENDIX G

1. Table of Treatment Means

SAT Arithmetic Computation (Grade Equivalent Score)

Diagnostic Category	Treatment	Covariate M	Unadjusted Criterion M	Adjusted Criterion M
Aggressive	Physical	3.100	2.950	2.928
	General	3.988	3.900	3.405
	Specific	3.062	2.488	2.485
	Control	3.850	3.788	3.366
Hyperactive	Physical	2.100	2.875	3.385
	General	2.300	2.262	2.666
	Specific	2.637	2.363	2.586
	Control	3.188	3.275	3.206
Withdrawn	Physical	2.512	2.425	2.715
	General	3.300	3.325	3.196
	Specific	3.637	3.238	2.929
	Control	3.025	1.925	1.943
Across All Diagnostic Categories	Physical	-----	-----	3.009
	General	-----	-----	3.089
	Specific	-----	-----	2.667
	Control	-----	-----	2.838
Aggressive	Across All Treatments	-----	-----	3.046
Hyperactive		-----	-----	2.951
Withdrawn		-----	-----	2.696
Across All Diagnostic Categories	Across All Treatments	-----	-----	2.901
		-----	-----	
		-----	-----	

NOTE: Each mean is based upon 8 observations.

Adjusted Analysis of Covariance

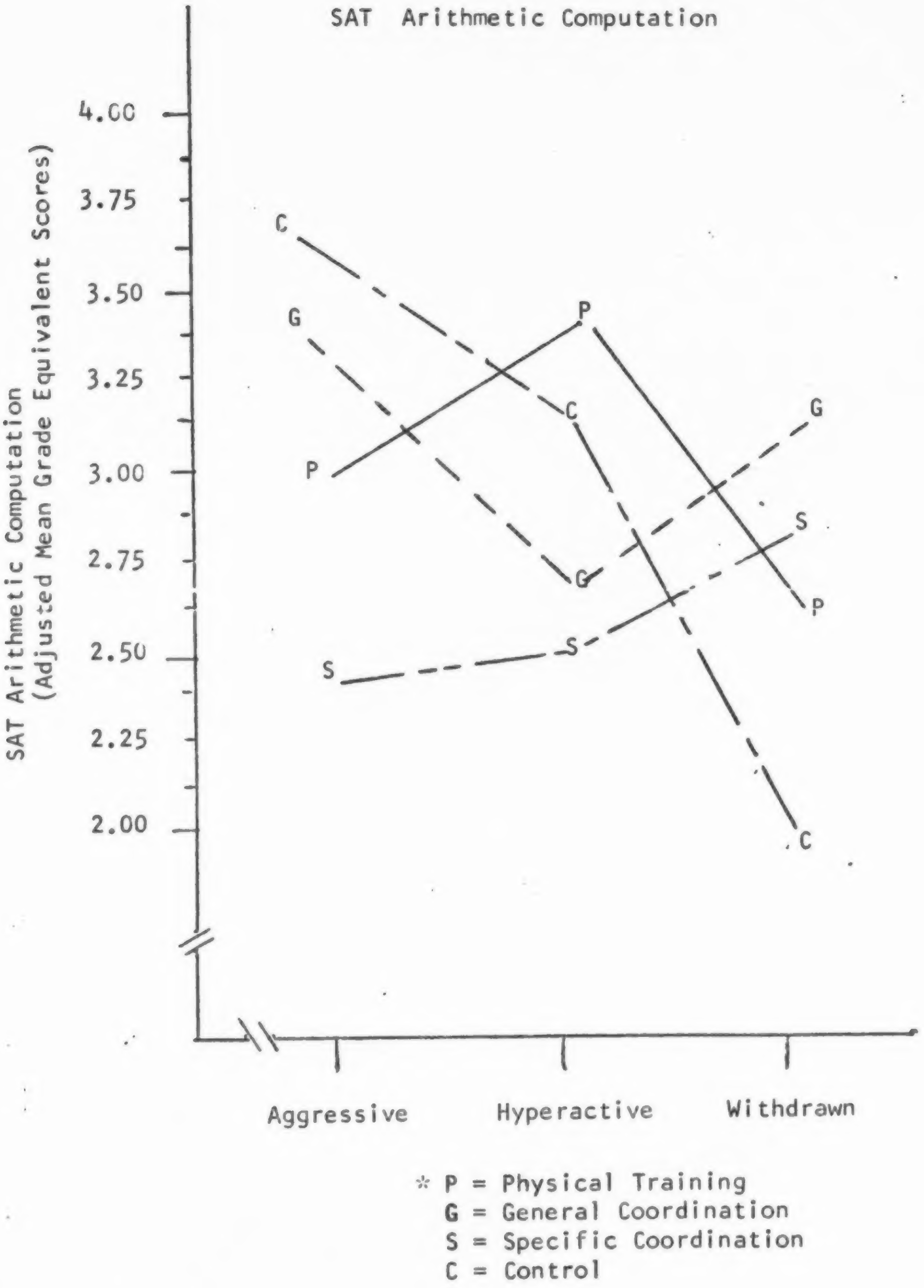
Summary Table 2.

Source	ss	df	ms	f	p less than
Diagnostic Group (A)	2.131	2	1.065	1.380	0.257
Treatment (B)	2.524	3	0.841	1.089	0.358
A x B	12.036	6	2.006	2.598	0.023
Regression	28.697	1	28.697	37.163	0.001
Within Cells	64.092	83	0.772	-	-

NOTE: From Multivariate Analysis of variance and Covariance Program of Clyde Computing Service, Miami, Florida.

Figure 1.

Diagnostic Group Means
Plotted for *Treatment
Groups on the Variable



3. Table of Treatment Means

SAT Word Meaning (Grade Equivalent Score)

Diagnostic Category	Treatment	Covariate M	Unadjusted Criterion M	Adjusted Criterion M
Aggressive	Physical	3.338	2.950	2.717
	General	4.500	5.113	3.876
	Specific	3.213	3.087	2.962
	Control	3.700	4.150	3.604
Hyperactive	Physical	1.750	2.662	3.800
	General	2.087	2.025	2.871
	Specific	2.488	2.950	3.451
	Control	3.138	3.137	3.077
Withdrawn	Physical	2.850	2.725	2.913
	General	3.275	4.225	4.046
	Specific	3.725	4.312	3.745
	Control	2.750	2.225	2.499
Across All Diagnostic Categories	Physical	-----	-----	3.143
	General	-----	-----	3.600
	Specific	-----	-----	3.386
	Control	-----	-----	3.060
Aggressive	Across All Treatments	-----	-----	3.291
Hyperactive		-----	-----	3.300
Withdrawn		-----	-----	3.301
Across All Diagnostic Categories	Across All Treatments	-----	-----	
		-----	-----	3.297
		-----	-----	

NOTE: Each mean is based upon 8 observations.

Adjusted Analysis of Covariance

Summary Table 4.

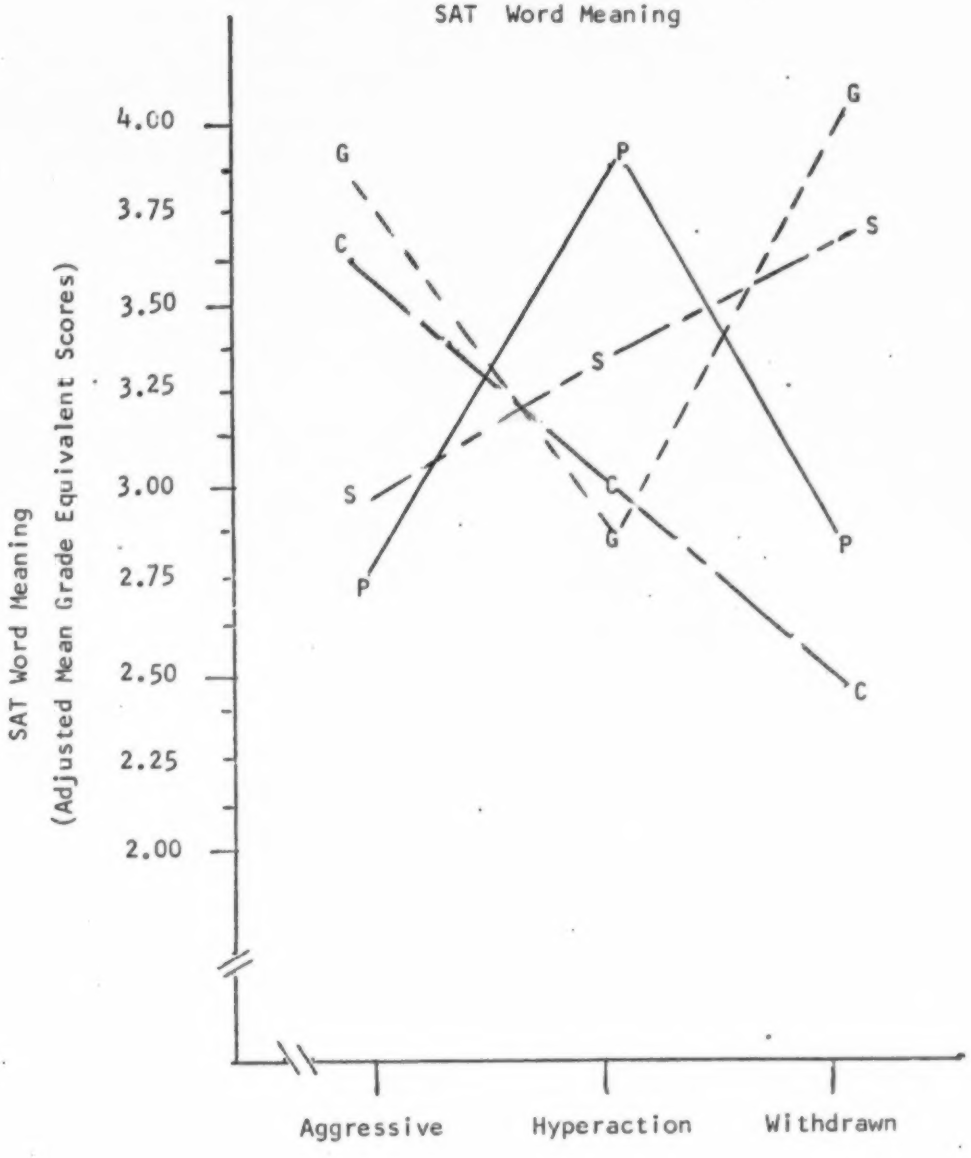
Source	ss	df	ms	f	p less than
Diagnostic Group (A)	0.002	2	0.001	0.001	0.999
Treatment (B)	4.240	3	1.413	1.079	0.362
A x B	18.883	6	3.147	2.404	0.034
Regression	146.165	1	146.165	111.629	0.001
Within Cells	108.679	83	1.309	-	-

NOTE: From Multivariate Analysis of variance and Covariance Program of Clyde Computing Service, Miami, Florida.

Figure 2.

Diagnostic Group Means
Plotted for *Treatment
Groups on the Variable

SAT Word Meaning



* P = Physical Training
G = General Coordination
S = Specific Coordination
C = Control

Treatment Means

SAT Paragraph Meaning (Grade Equivalent Score)

Diagnostic Category	Treatment	Covariate M	Unadjusted Criterion M	Adjusted Criterion M
Aggressive	Physical	3.013	2.750	2.616
	General	3.900	4.362	3.578
	Specific	3.212	3.137	2.857
	Control	3.538	4.013	3.494
Hyperactive	Physical	1.800	2.825	3.580
	General	1.975	1.850	2.477
	Specific	2.500	2.738	2.979
	Control	2.825	2.913	2.916
Withdrawn	Physical	2.350	2.425	2.777
	General	3.150	4.000	3.766
	Specific	3.000	3.500	3.376
	Control	2.700	2.912	3.008
Across All Diagnostic Categories	Physical	-----	-----	2.991
	General	-----	-----	3.274
	Specific	-----	-----	3.071
	Control	-----	-----	3.139
Aggressive	Across All Treatments	-----	-----	3.136
Hyperactive		-----	-----	2.988
Withdrawn		-----	-----	3.232
Across All Diagnostic Categories	Across All Treatments	----- ----- -----	----- ----- -----	3.119

NOTE: Each mean is based upon 8 observations.

Adjusted Analysis of Covariance

Summary Table 6.

Source	ss	df	ms	f	p less than
Diagnostic Group (A)	0.928	2	0.464	0.270	0.764
Treatment (B)	1.008	3	0.336	0.195	0.899
A x B	13.668	6	2.278	1.324	0.256
Regression	88.181	1	88.181	51.257	0.001
Within Cells	142.792	83	1.720	-	-

NOTE: From Multivariate Analysis of variance and Covariance Program of Clyde Computing Service, Miami, Florida.

7. Table of Treatment Means

WRAT Reading (Grade Equivalent Score)

Diagnostic Category	Treatment	Covariate M	Unadjusted Criterion M	Adjusted Criterion M
ggressive	Physical	3.625	3.475	3.197
	General	4.575	5.800	4.818
	Specific	2.325	3.138	3.822
	Control	3.575	3.675	3.434
Hyperactive	Physical	1.675	1.750	2.915
	General	2.525	2.738	3.273
	Specific	2.725	3.137	3.525
	Control	3.300	3.675	3.637
Withdrawn	Physical	3.850	3.413	2.968
	General	3.125	3.212	3.304
	Specific	4.250	4.300	3.559
	Control	3.437	2.025	1.885
Across All Diagnostic Categories	Physical	-----	-----	3.027
	General	-----	-----	3.798
	Specific	-----	-----	3.635
	Control	-----	-----	2.985
Aggressive	Across All Treatments	-----	-----	3.817
Hyperactive		-----	-----	3.338
Withdrawn		-----	-----	2.929
Across All Diagnostic Categories	Across All Treatments	-----	-----	3.361
		-----	-----	
		-----	-----	

NOTE: Each mean is based upon 8 observations.

Adjusted Analysis of Covariance

Summary Table 8.

Source	ss	df	ms	f	p less than
Diagnostic Group (A)	12.652	2	6.326	5.256	0.007
eatment (B)	12.473	3	4.158	3.455	0.020
A x B	14.481	6	2.414	2.005	0.074
Regression	143.703	1	143.703	119.403	0.001
Within Cells	99.891	83	1.204	-	-

NOTE: From Multivariate Analysis of variance and Covariance Program of Clyde Computing Service, Miami, Florida.

9. Table of
Treatment Means

WRAT Arithmetic (Grade Equivalent Score)

Diagnostic Category	Treatment	Covariate M	Unadjusted Criterion M	Adjusted Criterion M
ggressive	Physical	3.350	3.213	3.170
	General	4.013	4.775	4.378
	Specific	3.025	3.087	3.218
	Control	3.650	3.775	3.572
Hyperactive	Physical	2.300	3.350	3.868
	General	2.787	2.837	3.095
	Specific	3.063	3.075	3.186
	Control	3.113	3.625	3.709
Withdrawn	Physical	2.862	2.350	2.567
	General	3.438	3.250	3.160
	Specific	4.163	4.263	3.786
	Control	3.475	2.613	2.503
Across All Diagnostic Categories	Physical	-----	-----	3.202
	General	-----	-----	3.544
	Specific	-----	-----	3.396
	Control	-----	-----	3.261
Aggressive	Across All Treatments	-----	-----	3.584
Hyperactive		-----	-----	3.464
Withdrawn		-----	-----	3.004
Across All Diagnostic Categories	Across All Treatments	-----	-----	3.351
		-----	-----	
		-----	-----	

NOTE: Each mean is based upon 8 observations.

Adjusted Analysis of Covariance

Summary Table 10.

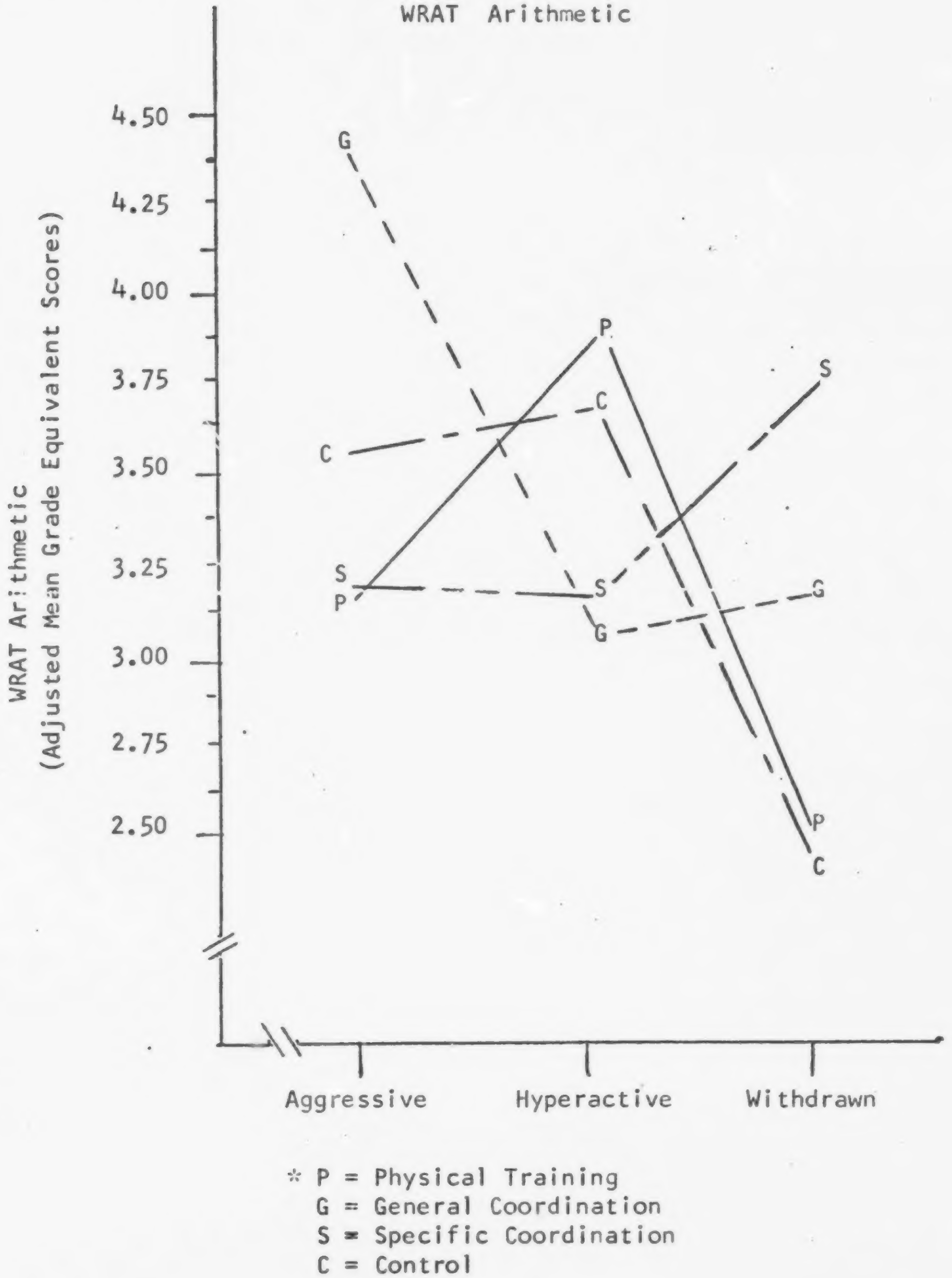
Source	ss	df	ms	f	p less than
Diagnostic Group (A)	5.968	2	2.984	2.841	0.064
Treatment (B)	1.646	3	0.549	0.522	0.668
A x B	17.456	6	2.909	2.770	0.017
Regression	35.259	1	35.259	33.567	0.001
Within Cells	87.185	83	1.050	-	-

NOTE: From Multivariate Analysis of variance and Covariance Program of Clyde Computing Service, Miami, Florida.

Figure 3.

Diagnostic Group Means
Plotted for *Treatment
Groups on the Variable

WRAT Arithmetic



Devereux - 1: Classroom Disturbance

11. Table of
TREATMENT MEANS

Treatment	Covariate Mean	Unadjusted Criterion Mean	Adjusted Criterion Mean
Physical Training	12.167	13.375	13.856
General Coordination	13.542	14.292	14.239
Specific Coordination	14.500	13.500	13.076
Control	13.417	13.625	13.621

Note - - Each mean is based upon 24 observations.

ADJUSTED ANALYSIS OF COVARIANCE
SUMMARY TABLE 12.

Source	SS	df	MS	F	P less than
Treatments	16.901	3	5.634	0.366	0.778
Regression	330.745	1	330.745	21.476	0.001
Within Cells	1401.463	91	15.401	---	---

Note - - From Multivariate Analysis of Variance and Covariance Program of Clyde Computing Service, Miami, Florida.

Devereux - 2: Impatience

13. Table of
TREATMENT MEANS

Treatment	Covariate Mean	Unadjusted Criterion Mean	Adjusted Criterion Mean
Physical Training	12.667	12.750	12.847
General Coordination	12.708	11.042	11.125
Specific Coordination	14.000	13.583	13.385
Control	13.042	14.583	14.597

Note - - Each mean is based upon 24 observations.

ADJUSTED ANALYSIS OF COVARIANCE
SUMMARY TABLE 14.

Source	SS	df	MS	F	P less than
Treatments	148.992	3	49.664	2.842	0.042
Regression	91.071	1	91.071	5.212	0.025
Within Cells	1590.056	91	17.473	---	---

Note - - From Multivariate Analysis of Variance and Covariance Program of Clyde Computing Service, Miami, Florida.

Devereux - 3: Disrespect - Defiance

15. Table of
TREATMENT MEANS

Treatment	Covariate Mean	Unadjusted Criterion Mean	Adjusted Criterion Mean
Physical Training	9.417	11.708	12.095
General Coordination	10.083	9.625	9.653
Specific Coordination	11.125	10.167	9.635
Control	9.917	10.208	10.326

Note - - Each mean is based upon 24 observations.

ADJUSTED ANALYSIS OF COVARIANCE
SUMMARY TABLE 16.

Source	SS	df	MS	F	P less than
Treatments	95.353	3	31.784	2.372	0.075
Regression	548.749	1	548.749	40.961	0.001
Within Cells	1219.126	91	13.397	---	---

Note - - From Multivariate Analysis of Variance and Covariance Program of Clyde Computing Service, Miami, Florida.

Devereux - 4: External Blame

17. Table of
TREATMENT MEANS

Treatment	Covariate Mean	Unadjusted Criterion Mean	Adjusted Criterion Mean
Physical Training	11.500	12.292	12.461
General Coordination	12.250	10.833	10.698
Specific Coordination	11.667	10.208	10.310
Control	12.250	11.417	11.281

Note - - Each mean is based upon 24 observations.

ADJUSTED ANALYSIS OF COVARIANCE
SUMMARY TABLE 18.

Source	SS	df	MS	F	P less than
Treatments	63.336	3	21.112	0.906	0.442
Regression	439.163	1	439.163	18.843	0.001
Within Cells	2120.922	91	23.307	---	---

Note - - From Multivariate Analysis of Variance and Covariance Program of Clyde Computing Service, Miami, Florida.

Devereux - 5: Achievement Anxiety

19. Table of
TREATMENT MEANS

Treatment	Covariate Mean	Unadjusted Criterion Mean	Adjusted Criterion Mean
Physical Training	12.917	12.167	11.975
General Coordination	12.333	10.167	10.170
Specific Coordination	11.917	8.792	8.935
Control	12.208	12.500	12.545

Note - - Each mean is based upon 24 observations.

ADJUSTED ANALYSIS OF COVARIANCE
SUMMARY TABLE 20.

Source	SS	df	MS	F	P less than
Treatments	197.830	3	65.943	3.043	0.033
Regression	266.619	1	266.619	12.303	0.001
Within Cells	1972.006	91	21.670	---	---

Note - - From Multivariate Analysis of Variance and Covariance Program of Clyde Computing Service, Miami, Florida.

Devereux - 6: External Reliance

21. Table of
TREATMENT MEANS

Treatment	Covariate Mean	Unadjusted Criterion Mean	Adjusted Criterion Mean
Physical Training	18.500	16.208	16.022
General Coordination	17.167	17.125	17.159
Specific Coordination	16.625	15.208	15.332
Control	17.208	17.875	17.903

Note - - Each mean is based upon 24 observations.

ADJUSTED ANALYSIS OF COVARIANCE
SUMMARY TABLE 22.

Source	SS	df	MS	F	P less than
Treatments	94.804	3	31.601	1.824	0.148
Regression	72.313	1	72.313	4.173	0.044
Within Cells	1576.853	91	17.328	---	---

Note - - From Multivariate Analysis of Variance and Covariance Program of Clyde Computing Service, Miami, Florida.

Devereux - 7: Comprehension

23. Table of
TREATMENT MEANS

Treatment	Covariate Mean	Unadjusted Criterion Mean	Adjusted Criterion Mean
Physical Training	11.500	12.708	12.889
General Coordination	12.125	11.667	11.635
Specific Coordination	11.833	12.583	12.651
Control	12.667	11.708	11.492

Note - - Each mean is based upon 24 observations.

ADJUSTED ANALYSIS OF COVARIANCE
SUMMARY TABLE 24.

Source	SS	df	MS	F	P less than
Treatments	35.350	3	11.783	1.793	0.154
Regression	118.904	1	118.904	18.089	0.001
Within Cells	598.178	91	6.573	-	-

Note - - From Multivariate Analysis of Variance and Covariance Program of Clyde Computing Service, Miami, Florida.

Devereux - 8: Inattentive - Withdrawn

25. Table of
TREATMENT MEANS

Treatment	Covariate Mean	Unadjusted Criterion Mean	Adjusted Criterion Mean
Physical Training	13.333	11.167	10.886
General Coordination	12.875	11.750	11.590
Specific Coordination	12.417	12.458	12.420
Control	10.458	9.458	9.937

Note - - Each mean is based upon 24 observations.

ADJUSTED ANALYSIS OF COVARIANCE
SUMMARY TABLE 26.

Source	SS	df	MS	F	P less than
Treatments	78.856	3	26.285	1.634	0.187
Regression	185.686	1	185.686	11.541	0.001
Within Cells	1464.063	91	16.089	-	-

Note - - From Multivariate Analysis of Variance and Covariance Program of Clyde Computing Service, Miami, Florida.

Devereux - 9: Irrelevant - Responsiveness

27. Table of
TREATMENT MEANS

Treatment	Covariate Mean	Unadjusted Criterion Mean	Adjusted Criterion Mean
Physical Training	10.083	9.375	9.479
General Coordination	10.417	10.125	10.134
Specific Coordination	11.208	9.708	9.492
Control	10.083	11.167	11.270

Note - - Each mean is based upon 24 observations.

ADJUSTED ANALYSIS OF COVARIANCE
SUMMARY TABLE 28.

Source	SS	df	MS	F	P less than
Treatments	50.824	3	16.941	1.779	0.157
Regression	99.791	1	99.791	10.477	0.002
Within Cells	866.748	91	9.525	-	-

Note - - From Multivariate Analysis of Variance and Covariance Program of Clyde Computing Service, Miami, Florida.

Devereux - 10: Creative - Initiative

29·Table of
TREATMENT MEANS

Treatment	Covariate Mean	Unadjusted Criterion Mean	Adjusted Criterion Mean
Physical Training	10.375	10.375	10.849
General Coordination	11.250	10.917	10.899
Specific Coordination	11.208	11.000	11.006
Control	12.042	13.250	12.788

Note - - Each mean is based upon 24 observations.

ADJUSTED ANALYSIS OF COVARIANCE
SUMMARY TABLE 30.

Source	SS	df	MS	F	P less than
Treatments	62.136	3	20.712	2.627	0.055
Regression	410.578	1	410.578	52.082	0.001
Within Cells	717.381	91	7.883	-	-

Note - - From Multivariate Analysis of Variance and Covariance Program of Clyde Computing Service, Miami, Florida.

Devereux - 11: Need Closeness to Teacher

31. Table of
TREATMENT MEANS

Treatment	Covariate Mean	Unadjusted Criterion Mean	Adjusted Criterion Mean
Physical Training	14.042	13.375	13.762
General Coordination	14.917	14.333	14.324
Specific Coordination	14.792	13.750	13.797
Control	15.833	15.292	14.867

Note - - Each mean is based upon 24 observations.

ADJUSTED ANALYSIS OF COVARIANCE
SUMMARY TABLE 32.

Source	SS	df	MS	F	P less than
Treatments	19.244	3	6.415	0.427	0.734
Regression	439.930	1	439.930	29.297	0.001
Within Cells	1366.486	91	15.016	-	-

Note - - From Multivariate Analysis of Variance and Covariance Program of Clyde Computing Service, Miami, Florida.

33. Table of
TREATMENT MEANS
Quay 1

Treatment	Covariate Mean	Unadjusted Criterion Mean	Adjusted Criterion Mean
Physical Training	7.333	7.333	7.561
General Coordination	7.417	7.167	7.354
Specific Coordination	8.625	7.167	6.767
Control	7.833	7.833	7.818

Note - - Each mean is based upon 24 observations.

ADJUSTED ANALYSIS OF COVARIANCE
SUMMARY TABLE 34.

Source	SS	df	MS	F	P less than
Treatments	14.350	3	4.783	0.230	0.875
Regression	703.634	1	703.634	33.812	0.001
Within Cells	1893.700	91	20.810		

Note - - From Multivariate Analysis of Variance and Covariance Program of Clyde Computing Service, Miami, Florida.

35. Table of
TREATMENT MEANS
Quay 2

Treatment	Covariate Mean	Unadjusted Criterion Mean	Adjusted Criterion Mean
Physical Training	7.042	7.000	6.795
General Coordination	6.375	5.708	5.699
Specific Coordination	5.167	5.250	5.596
Control	6.792	5.333	5.202

Note - - Each mean is based upon 24 observations.

ADJUSTED ANALYSIS OF COVARIANCE
SUMMARY TABLE 36.

Source	SS	df	MS	F	P less than
Treatments	33.318	3	11.106	1.064	0.369
Regression	98.626	1	98.626	9.446	0.003
Within Cells	950.163	91	10.441		

Note - - From Multivariate Analysis of Variance and Covariance Program of Clyde Computing Service, Miami, Florida.

37. Table of
TREATMENT MEANS
Quay 3

Treatment	Covariate Mean	Unadjusted Criterion Mean	Adjusted Criterion Mean
Physical Training	3.167	2.833	2.801
General Coordination	3.375	2.833	2.764
Specific Coordination	2.625	3.000	3.066
Control	2.792	1.958	1.994

Note - - Each mean is based upon 24 observations.

ADJUSTED ANALYSIS OF COVARIANCE
SUMMARY TABLE 38.

Source	SS	df	MS	F	P less than
Treatments	15.328	3	5.109	1.806	0.152
Regression	14.116	1	14.116	4.988	0.028
Within Cells	257.509	91	2.830		

Note - - From Multivariate Analysis of Variance and Covariance Program of Clyde Computing Service, Miami, Florida.

39. Table of
TREATMENT MEANS
Quay 4

Treatment	Covariate Mean	Unadjusted Criterion Mean	Adjusted Criterion Mean
Physical Training	0.500	0.625	0.685
General Coordination	0.667	0.583	0.579
Specific Coordination	0.958	0.625	0.509
Control	0.500	0.750	0.810

Note - - Each mean is based upon 24 observations.

ADJUSTED ANALYSIS OF COVARIANCE
SUMMARY TABLE 40.

Source	SS	df	MS	F	P less than
Treatments	1.210	3	0.403	0.422	0.738
Regression	14.530	1	14.530	15.189	0.001
Within Cells	87.053	91	0.957		

Note - - From Multivariate Analysis of Variance and Covariance Program of Clyde Computing Service, Miami, Florida.

41. Table of
TREATMENT MEANS
Bender Gestalt Error Scores

Treatment	Covariate Mean	Unadjusted Criterion Mean	Adjusted Criterion Mean
Physical Training	4.583	4.875	4.651
General Coordination	4.958	6.125	5.713
Specific Coordination	3.375	5.708	6.089
Control	3.625	5.667	5.922

Note - - Each mean is based upon 24 observations.

ADJUSTED ANALYSIS OF COVARIANCE
SUMMARY TABLE 42.

Source	SS	df	MS	F	P less than
Treatments	29.839	3	9.946	0.581	0.629
Regression	341.490	1	341.490	19.945	0.001
Within Cells	1558.048	91	17.121		

Note - - From Multivariate Analysis of Variance and Covariance Program of Clyde Computing Service, Miami, Florida.

43. Table of
TREATMENT MEANS
Bender Gestalt Developmental Age Scores

Treatment	Covariate Mean	Unadjusted Criterion Mean	Adjusted Criterion Mean
Physical Training	5.583	6.750	6.778
General Coordination	6.958	6.083	6.042
Specific Coordination	5.250	7.625	7.669
Control	6.750	5.083	5.053

Note - - Each mean is based upon 24 observations.

ADJUSTED ANALYSIS OF COVARIANCE
SUMMARY TABLE 44.

Source	SS	df	MS	F	P less than
Treatments	85.293	3	28.431	4.779	0.004
Regression	2.409	1	2.409	0.405	0.526
Within Cells	541.383	91	5.949		

Note - - From Multivariate Analysis of Variance and Covariance Program of Clyde Computing Service, Miami, Florida.

45.Table of
Treatment Means
Composite of ten physical measures
Strength

Diagnostic Category	Treatment	Covariate M	Unadjusted Criterion M	Adjusted Criterion M
Aggressive	Physical	2.555	3.336	1.583
	General	2.030	1.833	0.440
	Specific	0.817	5.122	4.561
	Control	2.871	1.313	-0.657
Hyperactive	Physical	-2.859	-2.010	-0.049
	General	0.450	-0.151	-0.460
	Specific	1.231	1.656	0.812
	Control	3.024	-0.136	-2.211
Withdrawn	Physical	-2.913	-0.841	1.157
	General	-4.257	-2.831	0.089
	Specific	0.864	0.734	0.142
	Control	-3.813	-8.022	-5.406
Across All Diagnostic Categories	Physical	-----	-----	.897
	General	-----	-----	.023
	Specific	-----	-----	1.838
	Control	-----	-----	-2.758
Aggressive	Across All Treatments	-----	-----	1.482
Hyperactive		-----	-----	-0.477
Withdrawn		-----	-----	-1.004
Across All Diagnostic Categories	Across All Treatments	----- ----- -----	----- ----- -----	0.000

NOTE: Each mean is based upon 8 observations.

Adjusted Analysis of Covariance
Summary Table 46.

Source	ss	df	ms	f	p less than
Diagnostic Group (A)	101.084	2	50.542	4.913	0.010
Treatment (B)	282.750	3	94.250	9.161	0.001
A x B	89.513	6	14.919	1.450	0.206
Regression	1431.299	1	1431.299	139.122	0.001
Within Cells	853.908	83	10.288		

NOTE: From Multivariate Analysis of variance and Covariance Program of Clyde Computing Service, Miami, Florida.

47.Table of
Treatment Means
Composite of 12 physical measures
Endurance

Diagnostic Category	Treatment	Covariate $\underline{M}$	Unadjusted Criterion $\underline{M}$	Adjusted Criterion $\underline{M}$
Aggressive	Physical	-0.130	0.608	0.633
	General	0.530	2.177	2.072
	Specific	1.560	3.074	2.765
	Control	-0.610	-1.851	-1.731
Hyperactive	Physical	-1.521	-0.730	-0.428
	General	-0.680	-0.257	-0.122
	Specific	0.120	1.238	1.214
	Control	2.084	-1.488	-1.901
Withdrawn	Physical	-0.569	-3.100	-2.987
	General	0.309	2.726	2.665
	Specific	1.331	0.774	0.510
	Control	-2.423	-3.172	-2.691
Across All Diagnostic Categories	Physical	-----	-----	-0.927
	General	-----	-----	1.538
	Specific	-----	-----	1.496
	Control	-----	-----	-2.108
Aggressive	Across All Treatments	-----	-----	0.935
Hyperactive		-----	-----	-0.309
Withdrawn		-----	-----	-0.626
Across All Diagnostic Categories	Across All Treatments	-----	-----	
		-----	-----	0.000
		-----	-----	

NOTE: Each mean is based upon 8 observations.

Adjusted Analysis of Covariance
Summary Table 48.

Source	ss	df	ms	f	$\underline{p}$ less than
Diagnostic Group (A)	43.362	2	21.681	1.821	0.041
eatment (B)	234.103	3	78.034	6.553	0.001
A x B	71.617	6	11.936	1.002	0.429
Regression	51.453	1	51.453	4.321	0.041
Within Cells	988.429	83	11.909		

NOTE: From Multivariate Analysis of variance and Covariance Program of Clyde Computing Service, Miami, Florida.

49.Table of
Treatment Means
Composite of 8 physical measures
Coordination

Diagnostic Category	Treatment	Covariate M	Unadjusted Criterion M	Adjusted Criterion M
Aggressive	Physical	1.096	0.380	-0.307
	General	1.485	1.954	1.023
	Specific	0.252	0.661	0.503
	Control	1.812	3.027	1.892
Hyperactive	Physical	-0.508	-0.974	-0.656
	General	-0.853	-0.617	-0.083
	Specific	0.098	0.316	0.254
	Control	0.073	1.499	1.453
Withdrawn	Physical	-0.772	-2.312	-1.828
	General	-1.040	-1.010	-0.359
	Specific	0.727	-0.983	-1.438
	Control	-2.375	-1.947	-0.458
Across All Diagnostic Categories	Physical	-----	-----	-0.930
	General	-----	-----	0.194
	Specific	-----	-----	-0.227
	Control	-----	-----	0.962
Aggressive	Across All Treatments	-----	-----	0.778
Hyperactive		-----	-----	0.242
Withdrawn		-----	-----	-1.021
Across All Diagnostic Categories	Across All Treatments	-----	-----	
		-----	-----	0.000
		-----	-----	

NOTE: Each mean is based upon 8 observations.

Adjusted Analysis of Covariance
Summary Table 50.

Source	ss	df	ms	f	p less than
Diagnostic Group (A)	51.958	2	25.979	4.021	0.022
Treatment (B)	45.109	3	15.036	2.327	0.081
A x B	6.931	6	1.155	0.179	0.982
Regression	422.957	1	422.957	65.467	0.001
Within Cells	536.227	83	6.461		

NOTE: From Multivariate Analysis of variance and Covariance Program of Clyde Computing Service, Miami, Florida.

51. Table of Treatment Means (WISC) CODING

Diagnostic Category	Treatment	Covariate M	Unadjusted Criterion M	Adjusted Criterion M
Aggressive	Physical	9.000	9.375	9.467
	General	8.750	9.375	9.606
	Specific	11.250	11.875	10.722
	Control	10.875	10.500	9.555
Hyperactive	Physical	10.000	9.500	9.039
	General	9.125	9.875	9.898
	Specific	9.125	9.500	9.523
	Control	10.375	9.500	8.832
Withdrawn	Physical	6.750	6.500	7.837
	General	7.625	7.750	8.603
	Specific	8.750	7.500	7.731
	Control	8.375	10.000	10.438
Across All Diagnostic Categories	Physical	-----	-----	8.781
	General	-----	-----	9.369
	Specific	-----	-----	9.325
	Control	-----	-----	9.608
Aggressive	Across All Treatments	-----	-----	9.838
Hyperactive		-----	-----	9.323
Withdrawn		-----	-----	8.652
Across All Diagnostic Categories	Across All Treatments	----- ----- -----	----- ----- -----	9.271

NOTE: Each mean is based upon 8 observations.

Adjusted Analysis of Covariance

Summary Table 52.

Source	ss	df	ms	f	p less than
Diagnostic Group (A)	20.274	2	10.137	2.468	0.091
Treatment (B)	8.585	3	2.862	0.697	0.557
A × B	42.825	6	7.137	1.738	0.122
Regression	194.110	1	194.110	47.262	0.001
Within Cells	340.890	83	4.107	---	---

NOTE: From Multivariate Analysis of variance and Covariance Program of Clyde Computing Service, Miami, Florida.

53.Table of Treatment Means

(WISC) COMPREHENSION

Diagnostic Category	Treatment	Covariate M	Unadjusted Criterion M	Adjusted Criterion M
Aggressive	Physical	7.000	9.000	9.498
	General	9.000	10.625	10.586
	Specific	8.875	8.875	8.869
	Control	9.375	9.125	8.985
Hyperactive	Physical	8.500	7.500	7.595
	General	9.750	7.875	7.634
	Specific	9.875	8.375	8.101
	Control	9.125	8.625	8.552
Withdrawn	Physical	7.125	6.000	6.465
	General	8.750	7.125	7.153
	Specific	10.500	9.625	9.183
	Control	8.375	8.000	8.129
Across All Diagnostic Categories	Physical	-----	-----	7.853
	General	-----	-----	8.458
	Specific	-----	-----	8.718
	Control	-----	-----	8.555
Aggressive	Across All Treatments	-----	-----	9.485
Hyperactive		-----	-----	7.971
Withdrawn		-----	-----	7.733
Across All Diagnostic Categories	Across All Treatments	-----	-----	8.396
		-----	-----	
		-----	-----	

NOTE: Each mean is based upon 8 observations.

Adjusted Analysis of Covariance

Summary Table 54.

Source	ss	df	ms	f	p less than
Diagnostic Group (A)	57.595	2	28.798	4.666	0.012
Treatment (B)	9.514	3	3.171	0.514	0.674
A x B	42.817	6	7.136	1.156	0.338
Regression	54.750	1	54.750	8.871	0.004
Within Cells	512.250	83	6.172	---	---

NOTE: From Multivariate Analysis of variance and Covariance Program of Clyde Computing Service, Miami, Florida.

55. Table of
Treatment Means
(WISC) OBJECT ASSEMBLY

Diagnostic Category	Treatment	Covariate M	Unadjusted Criterion M	Adjusted Criterion M
ggressive	Physical	10.375	11.500	11.647
	General	10.625	11.375	11.412
	Specific	11.500	10.125	9.777
	Control	13.375	12.375	11.202
Hyperactive	Physical	10.000	12.125	12.437
	General	10.000	11.000	11.312
	Specific	10.500	12.000	12.092
	Control	12.250	12.000	11.322
Withdrawn	Physical	10.625	9.375	9.412
	General	9.875	10.375	10.742
	Specific	10.375	10.250	10.397
	Control	9.000	9.125	9.877
Across All Diagnostic Categories	Physical	-----	-----	11.165
	General	-----	-----	11.155
	Specific	-----	-----	10.755
	Control	-----	-----	10.833
Aggressive	Across	-----	-----	11.010
Hyperactive	All	-----	-----	11.791
Withdrawn	Treatments	-----	-----	10.107
Across All	Across All	-----	-----	
Diagnostic	Treatments	-----	-----	10.969
Categories		-----	-----	

NOTE: Each mean is based upon 8 observations.

Adjusted Analysis of Covariance
Summary Table 56.

Source	ss	df	ms	f	p less than
Diagnostic Group (A)	44.808	2	22.404	4.849	0.010
eatment (B)	3.442	3	1.147	0.248	0.862
A x B	29.247	6	4.874	1.055	0.396
Regression	126.161	1	126.161	27.307	0.001
Within Cells	383.464	83	4.620	---	---

NOTE: From Multivariate Analysis of variance and Covariance Program of Clyde Computing Service, Miami, Florida.

57. Table of Treatment Means

(WISC) SIMILARITIES

Diagnostic Category	Treatment	Covariate M	Unadjusted Criterion M	Adjusted Criterion M
Aggressive	Physical	9.625	11.000	11.482
	General	11.125	11.375	11.086
	Specific	10.125	11.250	11.475
	Control	10.375	10.875	10.971
Hyperactive	Physical	9.000	9.000	9.803
	General	9.250	9.500	10.175
	Specific	11.125	11.625	11.336
	Control	11.000	10.000	9.775
Withdrawn	Physical	10.750	7.500	7.404
	General	11.000	12.125	11.900
	Specific	12.125	12.625	11.822
	Control	11.250	8.000	7.646
Across All Diagnostic Categories	Physical	-----	-----	9.563
	General	-----	-----	11.054
	Specific	-----	-----	11.544
	Control	-----	-----	9.464
Aggressive	Across All Treatments	-----	-----	11.254
Hyperactive		-----	-----	10.272
Withdrawn		-----	-----	9.693
Across All Diagnostic Categories	Across All Treatments	----- ----- -----	----- ----- -----	10.406

NOTE: Each mean is based upon 8 observations.

Adjusted Analysis of Covariance

Summary Table 58.

Source	ss	df	ms	f	p less than
Diagnostic Group (A)	39.300	2	19.650	3.324	0.041
Treatment (B)	78.897	3	26.299	4.449	0.006
A x B	85.672	6	14.279	2.415	0.034
Regression	216.228	1	216.228	36.578	0.001
Within Cells	490.647	83	5.911	---	---

NOTE: From Multivariate Analysis of variance and Covariance Program of Clyde Computing Service, Miami, Florida.

59.Table of Treatment Means

(WISC) VOCABULARY

Diagnostic Category	Treatment	Covariate M	Unadjusted Criterion M	Adjusted Criterion M
Aggressive	Physical	10.625	10.000	9.785
	General	11.000	10.500	10.056
	Specific	10.750	10.000	9.709
	Control	9.750	9.875	10.192
Hyperactive	Physical	12.000	10.250	9.198
	General	9.625	7.875	8.268
	Specific	10.500	9.250	9.111
	Control	10.625	10.000	9.785
Withdrawn	Physical	9.625	7.375	7.768
	General	9.375	9.000	9.545
	Specific	11.000	10.375	9.931
	Control	8.375	10.125	11.278
Across All Diagnostic Categories	Physical	-----	-----	8.917
	General	-----	-----	9.290
	Specific	-----	-----	9.584
	Control	-----	-----	10.418
Aggressive	Across All Treatments	-----	-----	13.247
Hyperactive		-----	-----	12.121
Withdrawn		-----	-----	12.841
Across All Diagnostic Categories	Across All Treatments	----- ----- -----	----- ----- -----	9.552

NOTE: Each mean is based upon 8 observations.

Adjusted Analysis of Covariance

Summary Table 60.

Source	ss	df	ms	f	p less than
Diagnostic Group (A)	11.694	2	5.847	1.652	0.198
eatment (B)	28.883	3	9.628	2.720	0.050
A x B	31.296	6	5.216	1.473	0.197
Regression	283.552	1	283.552	80.099	0.001
Within Cells	293.822	83	3.540	---	---

NOTE: From Multivariate Analysis of variance and Covariance Program of Clyde Computing Service, Miami, Florida.

61.Table of
Treatment Means
(WISC) BLOCK DESIGN

Diagnostic Category	Treatment	Covariate M	Unadjusted Criterion M	Adjusted Criterion M
Aggressive	Physical	9.750	9.500	10.098
	General	9.625	9.375	10.058
	Specific	11.500	11.875	11.277
	Control	13.125	12.625	10.917
Hyperactive	Physical	10.500	11.375	11.460
	General	9.875	9.750	10.262
	Specific	9.625	8.625	9.308
	Control	11.250	10.375	9.948
Withdrawn	Physical	10.125	8.250	8.592
	General	10.500	10.375	10.460
	Specific	11.375	9.625	9.113
	Control	10.250	10.125	10.381
Across All Diagnostic Categories	Physical	-----	-----	10.050
	General	-----	-----	10.260
	Specific	-----	-----	9.899
	Control	-----	-----	10.415
Aggressive	Across	-----	-----	10.588
Hyperactive	All	-----	-----	10.245
Withdrawn	Treatments	-----	-----	9.637
Across All Diagnostic Categories	Across All Treatments	----- ----- -----	----- ----- -----	10.157

NOTE: Each mean is based upon 8 observations.

Adjusted Analysis of Covariance
Summary Table 62.

Source	ss	df	ms	f	p less than
Diagnostic Group (A)	14.816	2	7.408	1.405	0.251
Treatment (B)	3.709	3	1.236	0.234	0.872
A x B	34.097	6	7.516	1.425	0.215
Regression	380.107	1	380.107	72.068	0.001
Within Cells	437.769	83	5.274	---	---

NOTE: From Multivariate Analysis of variance and Covariance Program of Clyde Computing Service, Miami, Florida.

63.Table of
Treatment Means
(WISC) PICTURE ARRANGEMENT

Diagnostic Category	Treatment	Covariate M	Unadjusted Criterion M	Adjusted Criterion M
Aggressive	Physical	10.250	10.500	10.561
	General	10.375	11.500	11.509
	Specific	10.625	12.125	12.030
	Control	11.625	11.375	10.864
Hyperactive	Physical	11.250	11.375	11.020
	General	9.250	10.875	11.351
	Specific	11.250	11.125	10.770
	Control	10.750	11.000	10.853
Withdrawn	Physical	9.125	7.375	7.903
	General	10.250	9.375	9.436
	Specific	11.125	11.375	11.072
	Control	8.875	8.125	8.757
Across All Diagnostic Categories	Physical	-----	-----	9.828
	General	-----	-----	10.765
	Specific	-----	-----	11.291
	Control	-----	-----	10.158
Aggressive	Across All Treatments	-----	-----	11.241
Hyperactive		-----	-----	10.999
Withdrawn		-----	-----	9.292
Across All Diagnostic Categories	Across All Treatments	-----	-----	
		-----	-----	10.511
		-----	-----	

NOTE: Each mean is based upon 8 observations.

Adjusted Analysis of Covariance
Summary Table 64.

Source	ss	df	ms	f	p less than
Diagnostic Group (A)	70.980	2	35.490	5.943	0.004
Treatment (B)	30.170	3	10.057	1.684	0.177
A x B	24.700	6	4.117	0.689	0.659
Regression	149.194	1	149.194	24.982	0.001
Within Cells	495.680	83	5.972	---	---

NOTE: From Multivariate Analysis of variance and Covariance Program of Clyde Computing Service, Miami, Florida.

65.Table of
Treatment Means

(WISC) PICTURE COMPLETION

Diagnostic Category	Treatment	Covariate M	Unadjusted Criterion M	Adjusted Criterion M
Aggressive	Physical	12.000	11.375	10.986
	General	10.500	10.625	10.993
	Specific	12.250	10.625	10.110
	Control	10.625	11.625	11.930
Hyperactive	Physical	10.500	11.125	11.493
	General	11.375	10.500	10.426
	Specific	11.625	11.125	10.925
	Control	12.625	11.750	11.046
Withdrawn	Physical	10.000	7.250	7.870
	General	11.250	12.125	12.114
	Specific	12.250	13.125	12.610
	Control	9.750	9.125	9.871
Across All Diagnostic Categories	Physical	-----	-----	10.116
	General	-----	-----	11.178
	Specific	-----	-----	11.215
	Control	-----	-----	10.949
Aggressive	Across All Treatments	-----	-----	11.005
Hyperactive		-----	-----	10.973
Withdrawn		-----	-----	10.616
Across All Diagnostic Categories	Across All Treatments	----- ----- -----	----- ----- -----	10.865

NOTE: Each mean is based upon 8 observations.

Adjusted Analysis of Covariance
Summary Table 66.

Source	ss	df	ms	f	p less than
Diagnostic Group (A)	2.948	2	1.474	0.182	0.834
[illegible]eatment (B)	18.774	3	6.258	0.772	0.513
A x B	112.888	6	18.815	2.321	0.040
Regression	266.146	1	266.146	32.837	0.001
Within Cells	672.729	83	8.105	---	---

NOTE: From Multivariate Analysis of variance and Covariance Program of Clyde Computing Service, Miami, Florida.

67.Table of Treatment Means

(WISC) INFORMATION

Diagnostic Category	Treatment	Covariate M	Unadjusted Criterion M	Adjusted Criterion M
Aggressive	Physical	8.750	8.750	8.809
	General	9.125	9.125	8.917
	Specific	8.500	10.250	10.488
	Control	8.375	8.125	8.452
Hyperactive	Physical	8.500	9.625	9.863
	General	7.875	8.125	8.808
	Specific	8.000	8.000	8.594
	Control	8.375	8.625	8.952
Withdrawn	Physical	9.125	7.375	7.167
	General	10.625	10.750	9.473
	Specific	9.500	11.000	10.525
	Control	9.250	8.375	8.078
Across All Diagnostic Categories	Physical	-----	-----	8.613
	General	-----	-----	9.066
	Specific	-----	-----	9.869
	Control	-----	-----	8.494
Aggressive	Across All Treatments	-----	-----	9.167
Hyperactive		-----	-----	9.054
Withdrawn		-----	-----	8.811
Across All Diagnostic Categories	Across All Treatments	-----	-----	9.011

NOTE: Each mean is based upon 8 observations.

Adjusted Analysis of Covariance

Summary Table 68.

Source	ss	df	ms	f	p less than
Diagnostic Group (A)	2.060	2	1.030	0.311	0.733
[illegible]eatment (B)	27.953	3	9.318	2.814	0.044
A x B	51.757	6	8.626	2.606	0.023
Regression	401.840	1	401.840	121.378	0.001
Within Cells	274.783	83	3.311	---	---

NOTE: From Multivariate Analysis of variance and Covariance Program of Clyde Computing Service, Miami, Florida.

69.Table of Treatment Means

(WISC) ARITHMETIC

Diagnostic Category	Treatment	Covariate M	Unadjusted Criterion M	Adjusted Criterion M
Aggressive	Physical	8.375	7.750	7.913
	General	10.250	8.625	7.451
	Specific	9.125	8.125	7.754
	Control	8.375	8.625	8.788
Hyperactive	Physical	9.625	8.375	7.647
	General	7.750	7.875	8.484
	Specific	8.000	8.500	8.931
	Control	8.125	7.125	7.467
Withdrawn	Physical	8.000	7.250	7.681
	General	8.750	8.875	8.771
	Specific	10.000	9.500	8.505
	Control	6.875	5.375	6.608
Across All Diagnostic Categories	Physical	-----	-----	7.747
	General	-----	-----	8.235
	Specific	-----	-----	8.397
	Control	-----	-----	7.621
Aggressive	Across All Treatments	-----	-----	7.977
Hyperactive		-----	-----	8.132
Withdrawn		-----	-----	7.891
Across All Diagnostic Categories	Across All Treatments	-----	-----	8.000
		-----	-----	
		-----	-----	

NOTE: Each mean is based upon 8 observations.

Adjusted Analysis of Covariance
Summary Table 70.

Source	ss	df	ms	f	p less than
Diagnostic Group (A)	0.955	2	0.477	0.133	0.876
Treatment (B)	9.866	3	3.289	0.915	0.437
A x B	32.062	6	5.344	1.487	0.193
Regression	381.786	1	381.786	106.260	0.001
Within Cells	298.215	83	3.593	---	---

NOTE: From Multivariate Analysis of variance and Covariance Program of Clyde Computing Service, Miami, Florida.

71.Table of Treatment Means

(WISC) VERBAL IQ

Diagnostic Category	Treatment	Covariate M	Unadjusted Criterion M	Adjusted Criterion M
Aggressive	Physical	92.500	95.500	97.632
	General	100.375	99.625	96.736
	Specific	96.750	96.250	95.672
	Control	94.625	94.625	95.402
Hyperactive	Physical	96.125	93.500	93.321
	General	92.250	89.375	91.667
	Specific	96.250	94.500	94.241
	Control	96.500	92.875	92.456
Withdrawn	Physical	92.750	83.000	84.973
	General	95.875	96.625	96.605
	Specific	104.375	103.500	98.060
	Control	91.750	87.125	89.735
Across All Diagnostic Categories	Physical	-----	-----	91.975
	General	-----	-----	95.003
	Specific	-----	-----	95.991
	Control	-----	-----	92.531
Aggressive	Across All Treatments	-----	-----	96.360
Hyperactive		-----	-----	92.921
Withdrawn		-----	-----	92.343
Across All Diagnostic Categories	Across All Treatments	-----	-----	93.875
		-----	-----	
		-----	-----	

NOTE: Each mean is based upon 8 observations.

Adjusted Analysis of Covariance

Summary Table 72.

Source	ss	df	ms	f	p less than
Diagnostic Group (A)	301.844	2	150.922	2.121	0.126
Treatment (B)	262.477	3	87.492	1.230	0.304
A x B	675.602	6	112.600	1.583	0.162
Regression	7416.020	1	7416.020	104.244	0.001
Within Cells	5904.719	83	71.141	---	---

NOTE: From Multivariate Analysis of variance and Covariance Program of Clyde Computing Service, Miami, Florida.

73. Table of
Treatment Means
(WISC) PERFORMANCE IQ

Diagnostic Category	Treatment	Covariate M	Unadjusted Criterion M	Adjusted Criterion M
Aggressive	Physical	102.375	103.500	104.013
	General	99.625	103.375	105.603
	Specific	110.500	109.375	104.821
	Control	113.500	111.875	105.449
Hyperactive	Physical	103.375	108.000	107.890
	General	99.625	102.250	104.478
	Specific	103.125	103.250	103.295
	Control	110.250	106.375	101.975
Withdrawn	Physical	95.125	84.500	89.535
	General	99.250	99.875	102.337
	Specific	106.750	104.250	102.034
	Control	94.875	96.000	101.191
Across All Diagnostic Categories	Physical	-----	-----	100.479
	General	-----	-----	104.139
	Specific	-----	-----	103.383
	Control	-----	-----	102.872
Aggressive	Across	-----	-----	104.972
Hyperactive	All	-----	-----	104.410
Withdrawn	Treatments	-----	-----	98.774
Across All	Across All	-----	-----	
Diagnostic	Treatments	-----	-----	102.719
Categories		-----	-----	

NOTE: Each mean is based upon 8 observations.

Adjusted Analysis of Covariance
Summary Table 74.

Source	ss	df	ms	f	p less than
Diagnostic Group (A)	719.223	2	359.611	4.329	0.016
Treatment (B)	179.531	3	59.844	0.720	0.543
A x B	900.980	6	150.163	1.808	0.107
Regression	7607.254	1	7607.254	91.579	0.001
Within Cells	6894.609	83	83.068	---	---

NOTE: From Multivariate Analysis of variance and Covariance Program of Clyde Computing Service, Miami, Florida.

75.Table of
Treatment Means

(WISC) TOTAL IQ

Diagnostic Category	Treatment	Covariate M	Unadjusted Criterion M	Adjusted Criterion M
Aggressive	Physical	97.125	99.125	100.514
	General	100.000	101.625	101.180
	Specific	103.750	102.625	99.786
	Control	104.000	103.250	100.252
Hyperactive	Physical	99.375	100.625	100.578
	General	95.125	96.250	98.916
	Specific	99.500	98.375	98.249
	Control	103.500	99.250	96.571
Withdrawn	Physical	93.375	82.375	86.158
	General	97.250	98.125	99.435
	Specific	106.125	104.375	100.020
	Control	92.500	90.250	94.591
Across All Diagnostic Categories	Physical	-----	-----	95.750
	General	-----	-----	99.844
	Specific	-----	-----	99.352
	Control	-----	-----	97.138
Aggressive	Across All Treatments	-----	-----	100.433
Hyperactive		-----	-----	98.579
Withdrawn		-----	-----	95.051
Across All Diagnostic Categories	Across All Treatments	-----	-----	
		-----	-----	98.021
		-----	-----	

NOTE: Each mean is based upon 8 observations.

Adjusted Analysis of Covariance
Summary Table 76.

Source	ss	df	ms	f	p less than
Diagnostic Group (A)	472.078	2	236.039	3.522	0.034
Treatment (B)	263.102	3	87.701	1.308	0.277
A x B	787.961	6	131.327	1.959	0.081
Regression	7363.879	1	7363.879	109.867	0.001
Within Cells	5563.109	83	67.025	---	---

NOTE: From Multivariate Analysis of variance and Covariance Program of Clyde Computing Service, Miami, Florida.

77.Table of Treatment Means

ITPA FACTOR I
AUDITORY RECEPTION

Diagnostic Category	Treatment	Covariate M	Unadjusted Criterion M	Adjusted Criterion M
Aggressive	Physical	34.125	35.250	34.973
	General	36.625	35.125	33.775
	Specific	33.125	34.250	34.402
	Control	30.875	33.250	34.367
Hyperactive	Physical	33.500	36.125	36.116
	General	36.000	32.625	31.543
	Specific	33.000	33.125	33.331
	Control	36.500	37.000	35.704
Withdrawn	Physical	34.250	32.000	31.669
	General	30.500	32.750	34.028
	Specific	33.000	33.500	33.706
	Control	30.250	32.125	33.510
Across All Diagnostic Categories	Physical	-----	-----	34.253
	General	-----	-----	33.115
	Specific	-----	-----	33.813
	Control	-----	-----	34.527
Aggressive	Across All Treatments	-----	-----	34.379
Hyperactive		-----	-----	34.174
Withdrawn		-----	-----	33.228
Across All Diagnostic Categories	Across All Treatments	----- ----- ----- -----	----- ----- ----- -----	33.927

NOTE: Each mean is based upon 8 observations.

Adjusted Analysis of Covariance

Summary Table 78.

Source	ss	df	ms	f	p less than
Diagnostic Group (A)	23.647	2	11.824	0.271	0.763
Treatment (B)	27.157	3	9.052	0.208	0.891
A x B	115.126	6	19.188	0.441	0.850
Regression	826.087	1	826.087	18.965	0.001
Within Cells	3615.284	83	43.558		

NOTE: From Multivariate Analysis of variance and Covariance Program of Clyde Computing Service, Miami, Florida.

79. Table of Treatment Means

ITPA FACTOR 2
VISUAL RECEPTION

Diagnostic Category	Treatment	Covariate M	Unadjusted Criterion M	Adjusted Criterion M
Aggressive	Physical	37.625	36.250	35.251
	General	39.125	39.750	37.965
	Specific	35.750	38.875	38.859
	Control	39.875	39.625	37.447
Hyperactive	Physical	36.500	41.250	40.840
	General	34.625	37.250	37.823
	Specific	38.125	39.375	38.114
	Control	35.500	42.250	42.365
Withdrawn	Physical	34.500	33.125	33.764
	General	27.250	32.125	36.564
	Specific	34.625	33.375	33.948
	Control	35.125	33.125	33.436
Across All Diagnostic Categories	Physical	-----	-----	36.618
	General	-----	-----	37.451
	Specific	-----	-----	36.974
	Control	-----	-----	37.749
Aggressive	Across All Treatments	-----	-----	37.381
Hyperactive		-----	-----	39.786
Withdrawn		-----	-----	34.428
Across All Diagnostic Categories	Across All Treatments	----- ----- -----	----- ----- -----	37.198

NOTE: Each mean is based upon 8 observations.

Adjusted Analysis of Covariance
Summary Table 80.

Source	ss	df	ms	f	p less than
Diagnostic Group (A)	442.429	2	221.215	7.019	0.002
[illegible]eatment (B)	18.082	3	6.027	0.191	0.902
A x B	198.924	6	33.154	1.052	0.398
Regression	1262.644	1	1262.644	40.061	0.001
Within Cells	2615.979	83	31.518		

NOTE: From Multivariate Analysis of variance and Covariance Program of Clyde Computing Service, Miami, Florida.

81.Table of Treatment Means

ITPA FACTOR 3
AUDITORY ASSOCIATION

Diagnostic Category	Treatment	Covariate M	Unadjusted Criterion M	Adjusted Criterion M
Aggressive	Physical	35.125	35.750	34.829
	General	40.125	41.500	37.948
	Specific	34.750	35.750	35.026
	Control	35.750	36.125	34.875
Hyperactive	Physical	33.625	33.750	33.618
	General	29.375	30.125	32.230
	Specific	35.125	37.125	36.204
	Control	37.250	36.500	34.461
Withdrawn	Physical	27.875	31.000	33.894
	General	29.125	28.625	30.861
	Specific	31.000	31.250	32.500
	Control	31.375	32.375	33.427
Across All Diagnostic Categories	Physical	-----	-----	34.114
	General	-----	-----	33.680
	Specific	-----	-----	34.577
	Control	-----	-----	34.254
Aggressive	Across All Treatments	-----	-----	35.670
Hyperactive		-----	-----	34.128
Withdrawn		-----	-----	32.671
Across All Diagnostic Categories	Across All Treatments	-----	-----	34.156
		-----	-----	
		-----	-----	

NOTE: Each mean is based upon 8 observations.

Adjusted Analysis of Covariance
Summary Table 82.

Source	ss	df	ms	f	p less than
Diagnostic Group (A)	129.750	2	64.875	1.662	0.196
Treatment (B)	9.941	3	3.314	0.085	0.968
A x B	150.296	6	25.049	0.642	0.696
Regression	1747.199	1	1747.199	44.770	0.001
Within Cells	3239.172	83	39.026	-	-

NOTE: From Multivariate Analysis of variance and Covariance Program of Clyde Computing Service, Miami, Florida.

83.Table of
Treatment Means

ITPA FACTOR 4
VISUAL ASSOCIATION

Diagnostic Category	Treatment	Covariate M	Unadjusted Criterion M	Adjusted Criterion M
Aggressive	Physical	31.500	32.125	32.715
	General	34.500	35.750	35.230
	Specific	32.375	36.125	36.391
	Control	35.875	38.250	37.221
Hyperactive	Physical	40.125	35.750	33.149
	General	30.000	32.000	33.145
	Specific	34.875	35.125	34.466
	Control	35.750	37.000	36.017
Withdrawn	Physical	30.625	27.375	28.288
	General	32.875	35.000	35.081
	Specific	29.000	35.625	37.140
	Control	29.625	33.125	34.408
Across All Diagnostic Categories	Physical	-----	-----	31.384
	General	-----	-----	34.485
	Specific	-----	-----	35.999
	Control	-----	-----	35.882
Aggressive	Across All Treatments	-----	-----	35.389
Hyperactive		-----	-----	34.194
Withdrawn		-----	-----	33.729
Across All Diagnostic Categories	Across All Treatments	----- ----- -----	----- ----- -----	34.437

NOTE: Each mean is based upon 8 observations.

Adjusted Analysis of Covariance
Summary Table 84.

Source	ss	df	ms	f	p less than
Diagnostic Group (A)	46.220	2	23.110	0.697	0.501
Treatment (B)	330.581	3	110.194	3.325	0.024
A x B	148.545	6	24.758	0.747	0.613
Regression	565.424	1	565.424	17.063	0.001
Within Cells	2750.328	83	33.136	-	-

NOTE: From Multivariate Analysis of variance and Covariance Program of Clyde Computing Service, Miami, Florida.

85.Table of
Treatment Means
ITPA FACTOR 5
VERBAL EXPRESSION

Diagnostic Category	Treatment	Covariate M	Unadjusted Criterion M	Adjusted Criterion M
Aggressive	Physical	31.750	32.000	31.934
	General	31.750	34.000	33.934
	Specific	32.125	34.500	34.252
	Control	35.750	35.625	33.616
Hyperactive	Physical	30.375	31.250	31.852
	General	32.375	30.875	30.506
	Specific	31.500	31.625	31.681
	Control	33.375	32.500	31.645
Withdrawn	Physical	28.750	29.125	30.516
	General	28.125	29.250	30.945
	Specific	32.375	33.625	33.256
	Control	31.125	30.250	30.488
Across All Diagnostic Categories	Physical	-----	-----	31.434
	General	-----	-----	31.795
	Specific	-----	-----	33.663
	Control	-----	-----	31.916
Aggressive	Across All Treatments	-----	-----	33.434
Hyperactive		-----	-----	31.421
Withdrawn		-----	-----	31.301
Across All Diagnostic Categories	Across All Treatments	----- ----- ----- -----	----- ----- ----- -----	32.052

NOTE: Each mean is based upon 8 observations.

Adjusted Analysis of Covariance

Summary Table 86.

Source	ss	df	ms	f	p less than
Diagnostic Group (A)	88.320	2	44.160	2.737	0.071
Treatment (B)	35.305	3	11.768	0.729	0.537
A x B	40.703	6	6.784	0.420	0.863
Regression	444.601	1	444.601	27.554	0.001
Within Cells	1339.275	83	16.136	-	-

NOTE: From Multivariate Analysis of variance and Covariance Program of Clyde Computing Service, Miami, Florida.

87. Table of Treatment Means

ITPA FACTOR 6
MANUAL EXPRESSION

Diagnostic Category	Treatment	Covariate M	Unadjusted Criterion M	Adjusted Criterion M
Aggressive	Physical	35.375	38.375	38.802
	General	38.125	39.625	39.446
	Specific	36.125	42.375	42.637
	Control	36.625	40.000	40.151
Hyperactive	Physical	40.500	40.500	39.798
	General	38.875	42.125	41.781
	Specific	37.750	42.750	42.654
	Control	41.500	39.875	38.952
Withdrawn	Physical	37.125	38.125	38.166
	General	33.000	32.000	32.950
	Specific	34.500	36.125	36.745
	Control	38.250	40.250	40.043
Across All Diagnostic Categories	Physical	-----	-----	38.922
	General	-----	-----	38.059
	Specific	-----	-----	40.679
	Control	-----	-----	39.715
Aggressive	Across All Treatments	-----	-----	40.259
Hyperactive		-----	-----	40.796
Withdrawn		-----	-----	36.976
Across All Diagnostic Categories	Across All Treatments	----- ----- -----	----- ----- -----	39.344

NOTE: Each mean is based upon 8 observations.

Adjusted Analysis of Covariance
Summary Table 88.

Source	ss	df	ms	f	p less than
Diagnostic Group (A)	259.969	2	129.984	6.072	0.003
Treatment (B)	89.928	3	29.976	1.400	0.248
A x B	261.489	6	43.581	2.036	0.070
Regression	139.449	1	139.449	6.515	0.013
Within Cells	1776.678	83	21.406	-	-

NOTE: From Multivariate Analysis of variance and Covariance Program of Clyde Computing Service, Miami, Florida.

89.Table of Treatment Means

ITPA FACTOR 7
GRAMMATICAL CLOSURE

Diagnostic Category	Treatment	Covariate M	Unadjusted Criterion M	Adjusted Criterion M
Aggressive	Physical	30.875	29.375	29.491
	General	36.875	38.250	34.664
	Specific	32.750	30.250	29.209
	Control	31.500	31.125	30.855
Hyperactive	Physical	29.875	31.500	32.233
	General	24.875	27.125	30.942
	Specific	30.875	33.500	33.616
	Control	32.250	34.375	33.642
Withdrawn	Physical	31.875	32.375	31.874
	General	30.625	34.250	34.520
	Specific	31.625	37.000	36.653
	Control	28.750	33.375	34.802
Across All Diagnostic Categories	Physical	-----	-----	31.199
	General	-----	-----	33.375
	Specific	-----	-----	33.159
	Control	-----	-----	33.099
Aggressive	Across All Treatments	-----	-----	31.054
Hyperactive		-----	-----	32.608
Withdrawn		-----	-----	34.462
Across All Diagnostic Categories	Across All Treatments	-----	-----	32.708
		-----	-----	
		-----	-----	

NOTE: Each mean is based upon 8 observations.

Adjusted Analysis of Covariance
Summary Table 90.

Source	ss	df	ms	f	p less than
Diagnostic Group (A)	184.528	2	92.264	2.791	0.067
Treatment (B)	73.895	3	24.632	0.745	0.528
A x B	204.576	6	34.096	1.031	0.411
Regression	2926.154	1	2926.154	88.523	0.001
Within Cells	2743.593	83	33.055	-	-

NOTE: From Multivariate Analysis of variance and Covariance Program of Clyde Computing Service, Miami, Florida.

91.Table of Treatment Means
ITPA FACTOR 8
VISUAL CLOSURE

Diagnostic Category	Treatment	Covariate M	Unadjusted Criterion M	Adjusted Criterion M
Aggressive	Physical	31.750	37.375	38.160
	General	33.125	38.375	38.398
	Specific	38.000	44.625	41.947
	Control	38.000	42.750	40.072
Hyperactive	Physical	37.625	46.000	43.529
	General	31.500	37.875	38.799
	Specific	34.250	41.625	41.025
	Control	36.875	41.000	38.945
Withdrawn	Physical	26.500	35.000	38.694
	General	29.625	28.500	30.463
	Specific	33.250	40.625	40.579
	Control	27.500	36.375	39.515
Across All Diagnostic Categories	Physical	-----	-----	40.128
	General	-----	-----	35.887
	Specific	-----	-----	41.184
	Control	-----	-----	39.511
Aggressive	Across All Treatments	-----	-----	39.644
Hyperactive		-----	-----	40.575
Withdrawn		-----	-----	37.313
Across All Diagnostic Categories	Across All Treatments	----- ----- -----	----- ----- -----	39.177

NOTE: Each mean is based upon 8 observations.

Adjusted Analysis of Covariance
Summary Table 92.

Source	ss	df	ms	f	p less than
Diagnostic Group (A)	160.672	2	80.336	2.292	0.107
Treatment (B)	372.679	3	124.226	3.545	0.018
A x B	325.769	6	54.295	1.549	0.172
Regression	1658.693	1	1658.693	47.327	0.001
Within Cells	2908.928	83	35.047	-	-

NOTE: From Multivariate Analysis of variance and Covariance Program of Clyde Computing Service, Miami, Florida.

93.Table of
Treatment Means
ITPA FACTOR 9
AUDITORY MEMORY

Diagnostic Category	Treatment	Covariate M	Unadjusted Criterion M	Adjusted Criterion M
Aggressive	Physical	34.250	34.625	34.670
	General	37.750	40.750	38.643
	Specific	34.625	34.250	34.064
	Control	32.125	32.750	34.101
Hyperactive	Physical	38.125	34.125	31.787
	General	31.875	32.625	34.130
	Specific	37.125	35.125	33.402
	Control	34.000	38.375	38.574
Withdrawn	Physical	32.250	36.125	37.400
	General	31.500	34.625	36.361
	Specific	36.625	39.625	38.210
	Control	31.625	32.250	33.909
Across All Diagnostic Categories	Physical	-----	-----	34.619
	General	-----	-----	36.378
	Specific	-----	-----	35.225
	Control	-----	-----	35.528
Aggressive	Across All Treatments	-----	-----	35.370
Hyperactive		-----	-----	34.473
Withdrawn		-----	-----	36.470
Across All Diagnostic Categories	Across All Treatments	----- ----- -----	----- ----- -----	35.438

NOTE: Each mean is based upon 8 observations.

Adjusted Analysis of Covariance

Summary Table 94.

Source	ss	df	ms	f	p less than
Diagnostic Group (A)	62.478	2	31.239	1.282	0.283
Treatment (B)	38.200	3	12.733	0.522	0.668
A x B	360.308	6	60.051	2.464	0.030
Regression	1335.194	1	1335.194	54.786	0.001
Within Cells	2022.804	83	24.371	-	-

NOTE: From Multivariate Analysis of variance and Covariance Program of Clyde Computing Service, Miami, Florida.

95.Table of Treatment Means

ITPA FACTOR 10 VISUAL MEMORY

Diagnostic Category	Treatment	Covariate M	Unadjusted Criterion M	Adjusted Criterion M
Aggressive	Physical	33.500	34.625	34.600
	General	35.875	37.375	35.934
	Specific	35.125	35.000	34.006
	Control	36.500	34.875	33.061
Hyperactive	Physical	34.125	35.375	34.977
	General	34.875	32.750	31.905
	Specific	33.500	35.500	35.475
	Control	36.750	38.625	36.662
Withdrawn	Physical	31.125	30.125	31.517
	General	29.375	35.375	37.810
	Specific	31.750	34.250	35.269
	Control	29.000	31.375	34.034
Across All Diagnostic Categories	Physical	-----	-----	33.698
	General	-----	-----	35.216
	Specific	-----	-----	34.917
	Control	-----	-----	34.586
Aggressive	Across All Treatments	-----	-----	34.400
Hyperactive		-----	-----	34.755
Withdrawn		-----	-----	34.658
Across All Diagnostic Categories	Across All Treatments	-----	-----	34.604

NOTE: Each mean is based upon 8 observations.

Adjusted Analysis of Covariance Summary Table 96.

Source	ss	df	ms	f	p less than
Diagnostic Group (A)	2.115	2	1.059	0.024	0.977
Treatment (B)	31.019	3	10.340	0.230	0.875
A x B	266.576	6	44.479	0.989	0.438
Regression	1186.449	1	1186.449	26.404	0.001
Within Cells	3729.547	83	44.934	-	-

NOTE: From Multivariate Analysis of variance and Covariance Program of Clyde Computing Service, Miami, Florida.